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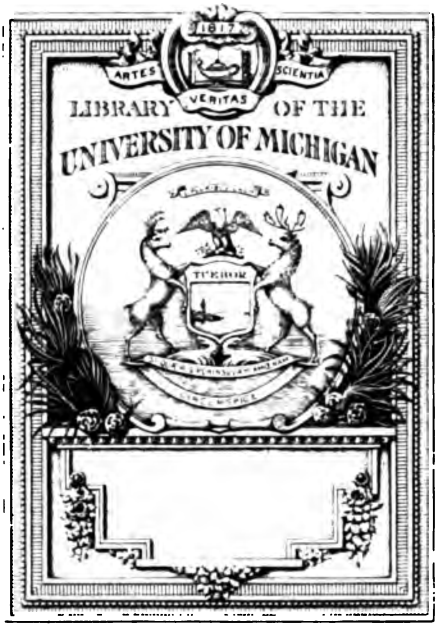
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FOR THE YEAR ENDING JUNE 30

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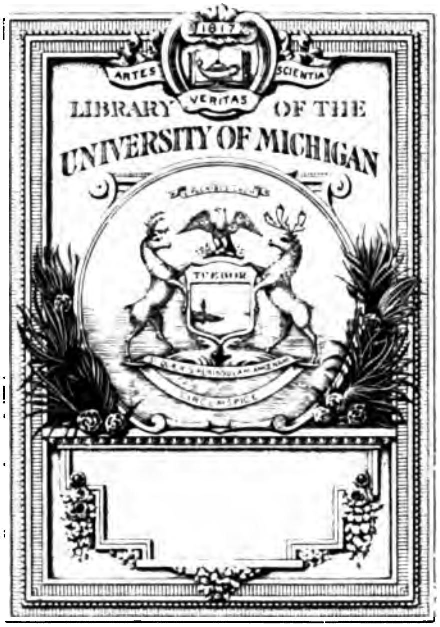

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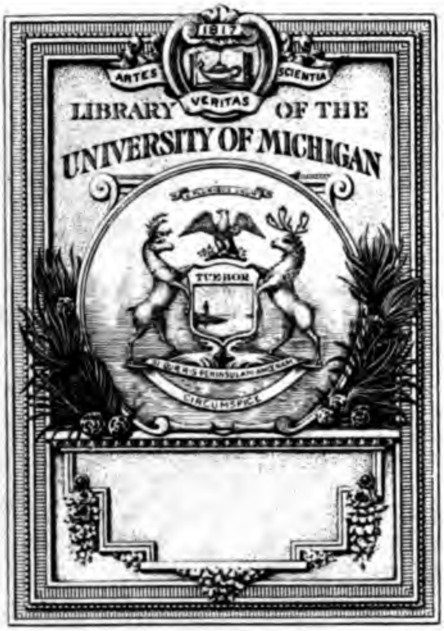

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REPORT

OF THE

SECRETARY OF THE SMITHSONIAN INSTITUTION

CHARLES D. WALCOTT

FOR THE YEAR ENDING JUNE 30, 1915.

To the Board of Regents of the Smithsonian Institution:

GENTLEMEN: I have the honor to submit herewith the annual report on the operations of the Smithsonian Institution and its branches during the fiscal year ending June 30, 1915, including work placed by Congress under the direction of the Board of Regents in the United States National Museum, the Bureau of American Ethnology, the International Exchanges, the National Zoological Park, the Astrophysical Observatory, and the United States Bureau of the International Catalogue of Scientific Literature.

The general report reviews the affairs of the Institution proper and briefly summarizes the operations of its several branches, while the appendices contain detailed reports by the assistant secretary and others directly in charge of various activities. The reports on operations of the National Museum and the Bureau of American Ethnology will also be published as independent volumes.

THE SMITHSONIAN INSTITUTION.

THE ESTABLISHMENT.

The Smithsonian Institution was created an establishment by act of Congress approved August 10, 1846. Its statutory members are the President of the United States, the Vice President, the Chief Justice, and the heads of the executive departments.

THE BOARD OF REGENTS.

The Board of Regents consists of the Vice President and the Chief Justice of the United States as ex officio members, three Members of the Senate, three Members of the House of Representatives, and six citizens, "two of whom shall be resident in the city of Washington and the other four shall be inhabitants of some State, but no two of them of the same State."

In regard to the personnel of the board there were no changes during the fiscal year. The roll of Regents on June 30 was as follows: Edward D. White, Chief Justice of the United States, Chancellor; Thomas R. Marshall, Vice President of the United States; Henry Cabot Lodge, Member of the Senate; Henry French Hollis, Member of the Senate; William J. Stone, Member of the Senate; Scott Ferris, Member of the House of Representatives; Ernest W. Roberts, Member of the House of Representatives; Maurice Connolly, former Member of the House of Representatives; Andrew D. White, citizen of New York; Alexander Graham Bell, citizen of Washington, D. C.; George Gray, citizen of Delaware; Charles F. Choate, jr., citizen of Massachusetts; John B. Henderson, jr., citizen of Washington, D. C.; and Charles W. Fairbanks, citizen of Indiana.

The board held its annual meeting on December 10, 1914. The Hon. George Gray was on that date elected chairman of the executive committee to fill the vacancy caused by the death of Senator Bacon on February 14, 1914. The proceedings of the above meeting, as also the annual financial report of the executive committee, have been printed, as usual, for the use of the Regents, while such important matters acted upon as are of public interest are reviewed under appropriate heads in the present report of the Secretary. A detailed statement of disbursements from Government appropriations, under the direction of the Institution for the maintenance of the National Museum, the National Zoological Park, and other branches, will be submitted to Congress by the Secretary in the usual manner in compliance with the law.

FINANCES.

The permanent fund of the Institution and the sources from which it was derived are as follows:

Deposited in the Treasury of the United States.

Bequest of James Smithson, 1846		$515, 169. 00
Residuary legacy of James Smithson, 1867		26, 210. 63
Deposit of savings of income, 1867		108, 620. 37
Bequest of James Hamilton, 1875	$1, 000	
Accumulated interest on Hamilton fund, 1895	1, 000	
		2, 000. 00
Bequest of Simeon Habel, 1880		500. 00
Deposits from proceeds of sale of bonds, 1881		51, 500. 00
Gift of Thomas G. Hodgkins, 1891		200, 000. 00
Part of residuary legacy of Thomas G. Hodgkins, 1894		8, 000. 00
Deposit from savings of income, 1903		25, 000. 00
Residuary legacy of Thomas G. Hodgkins, 1907		7, 918. 69
Deposit from savings of income, 1913		636. 94
Part of bequest of William Jones Rhees, 1913		251. 95
Deposit of proceeds from sale of real estate (gift of Robert Stanton Avery), 1913		9, 692. 42
Bequest of Addison T. Reid, 1914		4, 795. 91
Deposit of savings from income Avery bequest, 1914		204. 09

Deposit of savings from income Avery fund, 1915	$1,862.60
Deposit of savings from income Reid fund, 1915	426.04
Deposit of balance of principal $248.05 and income $28.39 Rhees fund, 1915	276.44
Deposit of first payment of Lucy T. and George W. Poore fund, 1915	24,534.92
Total of fund deposited in the United States Treasury	987,600.00

Other resources.

Registered and guaranteed bonds of the West Shore Railroad Co., part of legacy of Thomas G. Hodgkins (par value)	42,000.00
Total permanent fund	1,029,600.00

The first installment to the Lucy T. and George W. Poore fund, amounting to $24,534.92, was received in March, 1915, and was immediately deposited in the United States Treasury to the credit of the permanent fund. Other deposits to this fund during the year were from the income of several funds amounting to $2,565.08, or a grand total of $27,100, making a total now deposited in the Treasury to the credit of the permanent fund of $987,600.

That part of the fund deposited in the Treasury of the United States bears interest at 6 per cent per annum, under the provisions of the act organizing the Institution and an act of Congress approved March 12, 1894. The rate of interest on the West Shore Railroad bonds is 4 per cent per annum.

The income of the Institution during the year, amounting to $112,035.90, was derived as follows: Interest on the permanent foundation, $59,310; contributions from various sources for specific purposes, $12,000; first installment of a bequest known as the Lucy T. and George W. Poore fund, amounting to $24,534.92; the original bequest designated as the George H. Sanford fund of $1,020; the balance of the William Jones Rhees fund, amounting to $248.05; and from other miscellaneous sources, $14,922.93; all of which was deposited in the Treasury of the United States.

With the balance of $30,560.13 on July 1, 1914, the total resources for the fiscal year amounted to $142,596.03. The disbursements, which are given in detail in the annual report of the executive committee, amounted to $100,430.17, leaving a balance of $42,165.86 on deposit June 30, 1915, in the United States Treasury and in cash.

The Institution was charged by Congress with the disbursement of the following appropriations for the year ending June 30, 1915:

International Exchanges	$32,000
American Ethnology	42,000
Astrophysical Observatory	13,000

National Museum:	
Furniture and fixtures	$25,000
Heating and lighting	46,000
Preservation of collections	300,000
Books	2,000
Postage	500
Building repairs	10,000
Bookstacks for Government bureau libraries	10,000
National Zoological Park	100,000
International Catalogue of Scientific Literature	7,500
Tower telescope, Astrophysical Observatory, Mount Wilson, Cal	2,000
Repairs, Smithsonian Building	16,000
Total	606,000

In addition to the above specific amounts to be disbursed by the Institution there was included under the general appropriation for public printing and binding an allotment of $76,200, to cover the cost of printing and binding the annual report and other Government publications issued by the Institution, and to be disbursed by the Public Printer.

EXPLORATIONS AND RESEARCHES.

The "increase of knowledge" is one of the fundamental objects of the Smithsonian Institution, and toward the accomplishment of that object it has inaugurated and maintained or has participated in astronomical, anthropological, biological, and geological explorations in every portion of the world, resulting in greatly increasing our knowledge of the meteorology, the geography, the fauna and flora, and the ethnology of all lands, and in the acquisition of large amount of valuable material for the National Museum. The Institution has likewise, through special grants, aided laboratory researches in practically every line of natural science. The extent of these explorations and researches during the last 60 years covers a wide range, although a great deal more of most important work could have been accomplished had adequate funds been available. Friends of the Institution have many times, and particularly during the last few years, generously aided the work through the contribution of funds for specific purposes, but much yet remains undone, and opportunities for undertaking important lines of investigation are constantly being lost through lack of means to carry them into execution.

I will here allude only briefly to some of the activities of the Institution in these directions during the year and for details of other investigations may refer to the appendices containing the reports of those directly in charge of the several branches of the Institution.

GEOLOGICAL EXPLORATIONS IN THE ROCKY MOUNTAINS.

In continuation of my previous geological researches in the Rocky Mountains of Canada and Montana I spent a week during the field season of 1914 at Glacier, British Columbia, where I assisted Mrs. Walcott (née Mary M. Vaux) in measuring the flow of the Illecillewaet and Asulkan Glaciers.

From Glacier we proceeded to White Sulphur Springs, Mont., for the purpose of studying the ancient sedimentary pre-Paleozoic rocks of the Big Belt Mountains. These explorations were made on the eastern and southern slopes of this range, and then extended to the south on the Gallatin, Madison, and Jefferson Rivers.

It was found that the pre-Paleozoic sedimentary rocks were exposed by the uplift of the granite mass forming the summit of Mount Edith of the Big Belt Mountains in such a way that the thickness of the sandstones, limestones, and shales could be readily measured in the numerous sections exposed in the canyons worn by waters descending from the higher points to the valley surrounding the range. Nearly 5 miles in thickness of rock were measured, and in the limestone belts reefs of fossil algal remains were studied and large collections made with the assistance of Mrs. Walcott and Charles E. Resser and sent on to Washington.

It was found that the algal remains were deposited very much in the same manner as those that are now being deposited in many fresh-water lakes, and that many of the forms had a surprising similarity to those being deposited in the thermal springs and pools of the Yellowstone National Park.

In the lower portion of Deep Creek Canyon, southeast of the city of Helena, a deposit of siliceous shale was examined where some years ago I had discovered the remains of crablike animals suggesting in form the fresh-water crayfishes found in the streams and ponds all over the world. These fossils are the oldest animal remains now known, and the algal deposits which occur at intervals for several thousand feet below the shales containing the crustaceans are the oldest authentic vegetable remains. It is also most interesting that two types of bacteria have been found in a fossil state in the rock in association with the algal remains.

On the north side of the Gallatin River two very rich beds of algal remains were found, many of which, on account of the fossil being silicified and embedded in a softer limestone, were weathered out in relief.

For the season of 1915 I have planned some investigations in the Yellowstone Park in order to be able to better interpret the fossil algal remains found in and about the Big Belt Mountains.

STRATIGRAPHIC STUDIES IN CENTRAL TENNESSEE.

Under the joint auspices of the United States Geological Survey and the United States National Museum Dr. E. O. Ulrich and Dr R. S. Bassler, of the Museum, were engaged for several weeks during the summer of 1914 in a study of debated points in the stratigraphy of the Central Basin of Tennessee with a view to determin accurately the division line between the Chazyan and Black Rive groups and to secure additional information on the black shal problem.

The well-known marble beds of east Tennessee and associated shales and sandstones of Upper Chazyan age, with a thickness o over 3,000 feet, have never been found in central Tennessee or, in fact, in any area west of the Appalachian Valley. The first problem was therefore to determine either the corresponding rocks in the more western areas or, if such strata were wanting, to discover the unconformity representing this great thickness. It was found that the Lower Chazyan or Stones River rocks of central Tennessee are succeeded directly by the lowest Black River or Lowville formation and central Tennessee therefore was presumably a land area during the time of deposition of the celebrated east Tennessee marbles.

The second problem entailed further work on the determination of the age of the widespread Chattanooga black shale, which previously had been considered to be middle to late Devonian. In recent years this determination had been questioned, and facts had accumulated showing it to be of younger age. Two features of considerable significance in this problem were the discoveries in northern Tennessee where the shale is well exposed, that (1) this black shale passes without a discernible break into the overlying Mississippian (Kinderhook) shales, and (2) that the fossils of this overlying shale are of late instead of early Kinderhook age. As a result of this work good collections of several well-preserved faunas were added to the Museum collection.

FOSSIL ECHINODERMS IN WESTERN NEW YORK.

Field work carried on during the summer of 1914 under the supervision of Mr. Frank Springer, for the purpose of adding to th Springer collection of fossil echinoderms in the Museum, was devoted mainly to a careful examination of Silurian rocks exposed along th new Erie Canal in western New York, especially the waste materia thrown out in excavations for the canal. The most valuable specimens from this part of New York occur in the Rochester shales o Niagaran age, which weather rapidly into mud upon exposure to the elements, and it was therefore necessary that the new outcrops be examined at once to secure the best results. Numerous specimens of crinoids and cystids were found, a number of them having, as is rarely the case, root, stem, and crown preserved.

VERTEBRATE FOSSILS IN MONTANA.

Through cooperation with one of the field parties of the United States Geological Survey, Mr. Charles W. Gilmore, of the National Museum, spent three weeks during the summer of 1914 searching for fossil vertebrate remains in the Judith River formation in north central Montana. The most noteworthy discovery was the fragmentary remains of a fossil bird related to *Hesperornis*. It came from practically the same locality as the type of *Coniornis altus* Marsh, and is of importance as showing these bird remains as occurring in the upper part of the Claggett formation, whereas heretofore it was thought that *Coniornis* had come from the lower part of the Judith River formation.

CORAL INVESTIGATIONS.

Dr. T. Wayland Vaughan has for some time been engaged under the auspices of the Carnegie Institution in a study of the growth of corals, their rôle in reef building, and related problems. His field of investigation has been chiefly the coast of Florida, the Bahamas, and other regions of the West Indies. Large collections made by him in those localities have been received by the Museum.

BORNEO AND CELEBES EXPEDITIONS.

Through the generosity of Dr. W. L. Abbott, who for so many years has been a most generous contributor to the zoological and ethnological collections of the Museum, Mr. H. C. Raven conducted a collecting expedition in Borneo for a period of about two years. His work there was completed in September, 1914, having yielded about 3,000 interesting specimens of mammals and birds. Mr. Raven next crossed the Macassar Strait to the Island of Celebes, where he expects to remain for a considerable period and to secure important collections from a region heretofore poorly represented in the National Museum.

EXPEDITIONS TO THE FAR EAST.

Through the liberality of a gentleman who desired to remain unknown, Mr. Arthur de C. Sowerby has continued his zoological explorations in Manchuria and northeastern China and has forwarded a valuable collection of insects and vertebrates, including two wapiti bucks, a roe deer, two bears, and a peculiar rabbit.

Mr. Copley Amory, jr., a collaborator of the National Museum, joined a party accompanying Capt. J. Koren to the northeast coast of Siberia. It was Mr. Amory's intention to explore such territory as may be practicable from Nijni Kolymsk as a winter base, giving special attention to mammals and birds. When last heard from he had made a trip up the Lesser Ammi River, where he obtained a good number of fossil specimens, also some birds and small mammals.

BIRD STUDIES IN ILLINOIS.

Incidental to continued work on preparation of manuscript of the unpublished volumes of "Birds of North and Middle America" (Bulletin 50, U. S. National Museum), Mr. Robert Ridgway, during the past year, made a careful study of bird life in southern Illinois in order to compare present conditions with those existing half a century ago. It was found that with few exceptions the native birds are greatly decreased in numbers. At least three species (the passenger pigeon, wild turkey, and ruffed grouse) have totally disappeared from the region examined, while several others are on the verge of extermination. A few species, such as the crow blackbird (bronzed grackle) and blue jay, and perhaps the robin, are, apparently, as numerous as they were 50 years ago.

The principal causes which have brought about this greatly diminished bird life are: (1) In the case of the game birds, relentless shooting; (2) greatly reduced breeding and shelter areas, through clearing of forests, cutting away of woody growths along roadsides and fence lines, and drainage of swampy or marshy areas; (3) introduction of the European house sparrow, which has increased to such an extent that it now outnumbers, even on the farms, all the smaller native birds combined, greatly reducing their food supply and monopolizing the nesting sites of such species as the bluebird, purple martin, wrens, swallows, and other birds that nest in cavities or about buildings; (4) invasion of the woods and fields by homeless house cats and destruction of eggs and young (often the parents also) of ground-nesting species by "self-hunting" bird dogs (setters and pointers); and, probably, (5) spraying of orchards.

HENDERSON EXPEDITION IN CUBA.

Since the *Tomas Barrera* expedition to western Cuba, Mr. John B. Henderson, a regent of the Smithsonian Institution, has made two trips to eastern Cuba to supplement the work of that expedition.

One of these visits was to Cardenas Bay, where extensive, as well as intensive, dredgings yielded a lot of interesting marine organisms. The second trip embraced Cubitas Mountains, and was made in quest of land shells, which were needed to elucidate problems in the geographic distribution of the land mollusks.

As heretofore, Mr. Henderson's yacht, the *Eolis*, has been kept busy exploring the Pourtales Plateau. Numerous hauls in all depths of water have been made, and the material, which has arrived here from time to time, is exceedingly rich in marine invertebrates, particularly mollusks.

This year's efforts have resulted in the discovery of grounds with a more prolific, varied, and interesting fauna than previously known in this region.

BOTANICAL EXPLORATIONS IN SOUTH AMERICA.

Through cooperation with the Carnegie Institution of Washington the Museum was enabled to benefit by an expedition carried on by Dr. J. N. Rose during the summer and fall of 1914 along the west coast of South America in furtherance of his work on the Cactaceæ. About 3,000 specimens of cacti and other plants collected by him have been permanently deposited in the National Herbarium.

Dr. Rose explored a section through central Peru from Callao to Oroya, from sea level to the top of the Andes, at an altitude of 15,665 feet. Cacti were found in the greatest abundance at an altitude of 5,000 to 7,500 feet; but the various species range from a few feet above sea level to as high as 12,000 to 14,000 feet.

A second section was made across southern Peru, from Mollendo to Lake Titicaca via Arequipa. The highest point reached was 14,665 feet. Here also the cacti are found from near sea level nearly to the top of the Andes; but the most remarkable display is on the hills surrounding Arequipa, at an altitude of from 7,000 to 8,500 feet. While the cacti are abundant in both these regions, they are, with only a few possible exceptions, quite distinct. Side trips were made from Arequipa to Juliaca and Cuzco, in Peru, and to La Paz, Oruro, and Comanche, in Bolivia.

On the pampa below Arequipa are found the famous crescent-shaped sand dunes. Each dune or pile of sand is distinct in itself, often separated some distance from any other dune, and occurring, too, on rocky ground devoid of other sand. The dunes are found on the high mesa some 5,250 feet above the sea. They form definite regular piles of sand, each presenting a front 10 to 100 feet wide and 5 to 20 feet high, nearly perpendicular, crescent shaped, and from the crescent-shaped ridge tapering back to the surface in the direction from which the wind blows. These piles of shifting sand go forward about 40 feet a year.

In Chile two sections were made into the interior—one from Antofagasta to Calama, and one from Valparaiso to Santiago. The first is through the rainless deserts of northern Chile, the whole region being practically devoid of all vegetation. The second is across central Chile, the hills and valleys of which are veritable flower gardens, the hills often being a mass of yellow. Various trips were made in the central valley of Chile and one journey along the Longitudinal Railway of Chile extended from Caldera to Santiago. Special trips were made for certain rare plants like *Cereus castaneus*, first collected in 1862 and not since observed until found by Dr. Rose; and *Cactus horridus* and *Cactus Berteri*, described in 1833, but long since discarded by cactus students. In the central valley of Chile is seen that beautiful palm, the only one native of Chile, *Jubaea spectabilis* H. B. K., which often forms forests of considerable extent. From this palm is made the "Miel de Palma" so much used as a sirup on ships and at hotels.

Botanical explorations by Dr. Rose on the east coast of South America were in progress at the close of the fiscal year.

ANTHROPOLOGICAL RESEARCHES IN AFRICA AND SIBERIA.

In connection with the work of the division of physical anthropology in the National Museum, two expeditions were sent out during the year 1914 under the joint auspices of the Smithsonian Institution and the Panama-California Exposition at San Diego.

One of these expeditions was in charge of Dr. V. Schück, anthropologist of Prague, Bohemia, and its objects were: 1, to study the negro child in its native environment, and thereby create a basis of comparison for the study of the negro child in our country; 2, to visit the South African Bushmen for the purpose of obtaining measurements, photographs, and facial casts of the same; and 3, to visit British East Africa in search of the Pygmies. The tribe chosen for the child study were the Zulu, of Natal or Zululand, and over 1,000 children and adolescents of all ages—ages which could be definitely determined—were examined. These data are expected to contribute some very important results to anthropology. The Bushmen were reached in the Kalahari Desert, and besides other results 20 first-class facial casts were obtained of the people, which have since then been installed among the anthropological exhibits at San Diego. As to British East Africa, the work soon after a successful beginning was interrupted by the war.

The second expedition was in charge of Dr. St. Poniatowski, head of the ethnological laboratory at Warsaw. The object of this expedition was to visit a number of the remnants of native tribes in eastern Siberia, among which are found physical types which so closely resemble the American Indian. The expedition reached two such tribes, and secured valuable data, photographs, etc., when its work also was interrupted by the war.

THE NATURAL HISTORY OF MAN.

Some of the results of exploration and field work by the Institution among various races of mankind are shown in connection with the anthropological exhibits of the Panama-California Exposition at San Diego. These exhibits were in preparation for over three years. They are original and much more comprehensive than any previous exhibits in this line, either in this country or abroad. Dr. Hrdlička, under whose direction this exhibit was prepared, describes it as follows:

> The exhibits fill five large connecting rooms, which occupy the building of the Science of Man at the Exposition. Four of these rooms are devoted to the natural history of man, while the fifth is fitted up as a modern anthropological laboratory, library, and lecture room. Of the four rooms of exhibits proper, the first is devoted to man's phylogeny, or evolution; the second, to his ontogeny, or life cycle at the present time; the third, to his variation (sexual, individual, racial); and the fourth, to his pathology and death.

The exhibits in room 1, on Human Evolution, consist of: (a) A large series of accurate, first-class casts of all the more important skeletal remains of authentic antiquity; (b) photographic enlargements and water color sketches showing the localities where the specimens were discovered; (c) charts showing the relation of the archeological position of the various finds, and their relation to the extinct fauna and to archeological epochs; (d) a series of sketches by various scientific men showing their conception of the early man, with several illustrations of drawings, statuettes, and bas-reliefs, showing early man as drawn or sculptured by the ancient man himself; and (e) a remarkable series of 10 large busts prepared by the eminent Belgian sculptor, M. Mascré, under the direction of Prof. Rutot, representing early man at different periods of his physical advancement.

The main part of the exhibits in room No. 2, devoted to man's development at the present time, from the ovum onward, are three series of true-to-nature busts, showing by definite age-stages, from birth onward and in both sexes, the three principal races of this country, namely, the "thoroughbred" white American (for at least three generations in this continent on each parental side), the Indian, and the full-blood American negro. These series, which required two and one-half years of strenuous preparation, form a unique exhibit, for nothing of similar nature has ever been attempted in this or any other country. Each set consists of 30 busts, 15 males and 15 females, and proceeds from infants at or within a few days after birth to the oldest persons that could be found. The oldest negro woman is 114. After the new born, the stages are 9 months, 3 years, 6, 10, 15, 20, 28, 35, 45, 55, 65, and 75 years. The utmost care was exercised in ascertaining the age, particularly among the negro and Indian. No choice was made of the subjects beyond that due to the requirements of pedigree, age, and good health. The whites and negroes were obtained, with a few exceptions, in Washington and vicinity, but their places of birth range over a large part of the Eastern, Southern, and Middle States; for the Indian, we chose the Sioux, a large, characteristic, and in a very large measure still pureblood tribe, and one in which the determination of the ages of the subjects was feasible. Special trips were made to these people, and no pains were spared to get just what was wanted; in the case of the new born, it was actually necessary to wait until they came.

Other exhibits in room 2 show the development, by various stages, of the human brain, the skull, and various other parts of the body. A large series of original specimens show the most closely related animal forms to man at the present time, particularly the anthropoid apes; a series of charts on the walls deal with the phenomena of senility; finally, 10 photographic enlargements show living centenarians of various races.

Human variation is shown in room 3 by 10 sets of large busts representing 10 of the more important races of man; by 200 original transparencies giving racial portraits; by over 100 bronzed facial casts, showing individual variations within some of the more important branches of humanity; and by numerous charts and other exhibits.

In room 4 a series of charts and maps relates to the death rate in various countries, to the principal causes of death in the different parts of the world, and to the distribution of the more common diseases over the earth. Actual pathology is illustrated extensively by prehistoric American material. Many hundreds of original specimens, derived principally from the pre-Columbian cemeteries of Peru, show an extensive range of injuries and diseases, such as have left their marks on the bones. In many instances the injuries are very interesting, both from their extent and the extraordinary powers of recuperation shown in the healing; while among the diseases shown on the bones there are some that find no, or but little, parallel among the white man or even the Indian of to-day. In addition this room contains a series of 60 skulls with pre-Columbian operations (trepanation).

ISLAND OF TIMOR EXPEDITION.

Among the projected expeditions interrupted by the European war was one to the Island of Timor, in the East Indies. This island has been a rich collecting ground for scientific study, though little has been done by the paleontologist. An opportunity was offered for making collections at Timor through the courtesy and interest of Mr. N. E. Crane, a retired engineer, of Pittsburgh, who had planned to visit the island. The fund for this enterprise was contributed by Mr. Crane, Mrs. E. H. Harriman, and Mr. Frank Springer, but the expedition has been postponed for the present.

CLEARING OF FOG BY ELECTRICAL PRECIPITATION.

The fact was long ago scientifically established that all dust and fog particles in the open atmosphere are electrified and subject to dispersion or precipitation, but how to clear fog from a street, along a railway, or from the neighborhood of a ship at sea, and to do it in a manner commercially feasible has been a matter of serious study for many years. The question having recently aroused fresh attention, particularly in the neighborhood of San Francisco, through researches planned by the University of California in cooperation with the United States Lighthouse Service, it was decided by the Smithsonian Institution during the past year to make an appropriation to further this investigation, which is under the general direction of Dr. F. G. Cottrell, who has done so much toward the practical precipitation of dust, smoke, and chemical fumes at large industrial plants. The American Institute of Electrical Engineers has also appointed a committee to cooperate in this great work, and reports on the results of the study are awaited with much interest. The essential element to success in scattering fog seems to be some form of electrical apparatus of very high direct voltage, with facilities for its control and ready application.

RESEARCH CORPORATION.

In previous reports I have called attention to the Research Corporation formed primarily to undertake the development of certain precipitation patents generously offered to the Institution by Dr. F. G. Cottrell. Although it was impracticable for the Smithsonian Institution to administer this work directly, yet there was no objection to the Secretary becoming a member of a distinct organization that would undertake its development. An independent organization was accordingly formed in 1912 under the laws of the State of New York, the Secretary of the Institution becoming one of the directors of the Research Corporation and a member of the executive committee. The board of directors includes a number of prominent men of wide business experience, such as James J. Storrow, of Lee, Higginson & Co., Boston; Charles A. Stone, of Stone & Webster, Boston; Arthur D. Little, of the Little Chemical Co., Boston; T. Coleman du Pont, of Wilmington, Del.; Elon H. Hooker, president of the Hooker Electrochemical Co., Niagara Falls, N. Y.; Benjamin B. Lawrence, mining engineer, New York; George F. Kunz, of Tiffany & Co.; Frederick A. Goetze, dean of the engineering department of Columbia University, New York; William Barclay Parsons, engineer, of New York; and Hennen Jennings, mining engineer, of Washington.

The principal object of the corporation is to acquire inventions and patents and to make them more available in the arts and industries, while using them as a source of income, and, second, to apply all profiits derived from such use to the advancement of technical and scientific investigation and experimentation through the agency of the Smithsonian Institution and such other scientific and educational institutions and societies as may be selected by the directors.

The chief assets of the corporation at present are the Cottrell patents relating to the precipitation of dust, smoke, and chemical fumes by the use of electrical currents. Dr. F. G. Cottrell, the inventor and donor of these patents, has described their operation and advantages and the progress thus far made in their installation in an article printed in the Smithsonian Report for 1913.

There is now under consideration the acceptance and development of other patents besides those presented by Dr. Cottrell. It is planned that when the funds of the corporation received from royalties and other sources shall have reached $100,000, to apply the income "to the advancement of technical and scientific investigation and experimentation" as provided by the act of incorporation.

Owing to the wide experience of the members of the board and their standing in the business community, it has been possible to do work in connection with the Research Corporation that would have required the expenditure of large sums if undertaken by an ordinary business organization or private individual.

HARRIMAN TRUST FUND.

Aided by the income of a special fund established by Mrs. E. H. Harriman, Dr. C. Hart Merriam, research associate of the institution, has continued and practically completed his studies of the big bears of America, so that it is now possible to determine the relations of most of the species and to arrange them in definite groups. Of the true grizzlies there appear to be about 38 species and subspecies representing a dozen groups, and of the brown bears about 10 species, representing 5 groups. Opportunity will now be afforded for study in other fields of biological research.

THE LANGLEY AERODYNAMICAL LABORATORY.

The Langley Aerodynamical Laboratory was reopened under resolution of the Board of Regents adopted May 1, 1913, and on May 23 an advisory committee was organized, as detailed in my report for that year. In my last report I reviewed what had been accomplished up to June 30, 1914, in certain lines of investigation, including the successful flights of the Langley aeroplane built in 1898–1903, and further trials of that machine were described by Dr. A. F. Zahm in an article in the general appendix of the Smithsonian Report for 1914.

During the past year it was found necessary for legal reasons to discontinue the advisory committee as originally organized, and it therefore seemed advisable to call upon Congress to authorize the establishment of a national advisory committee for aeronautics.

Following an urgent appeal by myself and others to the Senate Committee on Naval Affairs, there was inserted in the naval appropriation act (Public, No. 271, 63d Cong.) approved March 3, 1915, the following provision for a national advisory committee for aeronautics.

* * * * * * *

An Advisory Committee for Aeronautics is hereby established, and the President is authorized to appoint not to exceed twelve members, to consist of two members from the War Department, from the office in charge of military aeronautics; two members from the Navy Department, from the office in charge of naval aeronautics; a representative each of the Smithsonian Institution, of the United States Weather Bureau, and of the United States Bureau of Standards; together with not more than five additional persons who shall be acquainted with the needs of aeronautical science, either civil or military, or skilled in aeronautical engineering or its allied sciences: *Provided*, That the members of the Advisory Committee for Aeronautics, as such, shall serve without compensation: *Provided further*, That it shall be the duty of the Advisory Committee for Aeronautics to supervise and direct the scientific study of the problems of flight, with a view to their practical solution, and to determine the problems which should be experimentally attacked, and to discuss their solution and their application to practical questions. In the event of a laboratory or laboratories, either in whole or in part, being placed under the direction of the committee, the committee may direct and conduct research and experiment in aeronautics in such laboratory or laboratories: *And provided further*, That rules and regulations for the conduct of the work of the committee shall be formulated by the committee and approved by the President.

That the sum of $5,000 a year, or so much thereof as may be necessary, for five years is hereby appropriated, out of any money in the Treasury not otherwise appropriated, to be immediately available, for experimental work and investigations undertaken by the committee, clerical expenses and supplies, and necessary expenses of members of the committee in going to, returning from, and while attending, meetings of the committee: *Provided,* That an annual report to the Congress shall be submitted through the President, including an itemized statement of expenditures.

On July 27, 1914, the Institution published a report by Dr. Zahm on European aeronautical laboratories, in which he describes the buildings, equipment, and operations of laboratories in England, France, and Germany.

Although, as above stated, it was not practical to continue the advisory committee of 1913 as originally planned, nevertheless the individual members of the committee have been active in their investigations, and several valuable reports have been received, some of which are as yet confidential or incomplete, one of those being a report on wireless communications to and from air craft.

Mr. Buckingham completed and published a masterly paper on the mathematical principle governing the relations of experimental models of all sorts to those of full-scale machines. Dr. Humphreys published a long paper on the Physics of the Atmosphere. Dr. Zahm helped to design for the United States Army a 200-horsepower biplane, and published a mathematical method of analyzing the stresses sustained by such an aeroplane during flight.

At the annual meeting of the Regents on December 10, 1914, Dr. Alexander Graham Bell, Senator William J. Stone, Representative Ernest W. Roberts, Mr. John B. Henderson, jr., and Secretary Walcott were appointed a committee to consider questions relative to the Langley Aerodynamical Laboratory.

PUBLICATIONS.

The publications of the Smithsonian Institution and its branches during the year comprised a total of 6,753 printed pages, accompanied by 655 plates of illustrations, and the number of copies distributed of these various publications, both pamphlets and bound volumes, aggregated 132,010.

The Institution has for one of its primary objects the "diffusion of knowledge," and this aim is carried out by printing and distributing the results of scientific investigations, accounts of explorations and researches, of progress in the various branches of science, and of development in any phase of human endeavor which would tend to increase "knowledge among men." Of its three series of publications, the Contributions to Knowledge, Miscellaneous Collections, and the annual reports, the first two are issued in limited editions at the expense of the Institution and are sent out to libraries, institutions, and interested individuals throughout the world. The annual reports, containing in addition to the administrative reports a general appendix of original and selected papers showing the recent progress made in all branches of natural and applied science, are printed under congressional appropriation, so that a larger edition and more widespread distribution is possible.

Under the direction of the Institution are issued the various publications of its branches, (*a*) the annual report, the Proceedings, and the Bulletins of the National Museum, including the series of Contributions from the National Herbarium; (*b*) the Annual Reports and Bulletins of the Bureau of American Ethnology; and (*c*) the Annals of the Astrophysical Observatory. These series are all public documents and are printed by means of annual allotments by act of Congress.

Smithsonian Contributions to Knowledge.—The requirements for memoirs in this series are that they be accounts of extended original research constituting important additions to knowledge. Since the first appearance of this series in 1848, 35 quarto volumes containing 150 memoirs have been issued, the most recent one being the "Langley Memoir on Mechanical Flight," in which are recorded the results of the late Secretary Langley's experiments establishing the practicability of heavier-than-air flying machines.

Smithsonian Miscellaneous Collections.—Fourteen papers forming parts of four volumes of this series were issued during the year, among them one paper on Cambrian geology by your Secretary. Another interesting paper was that by Messrs. Abbot, Fowle, and Aldrich recording new solar radiation researches, in the course of which free balloons carrying recording apparatus, ascended to a height of over 15 miles and were found on their descent with the records in good condition. As a result of these and other experiments, the authors abide by their former results, namely, that "the mean value of the 'solar constant' is 1.93 calories per square centimeter per minute." In this series, the sixth revised edition of the Smithsonian Physical Tables was issued, and was practically exhausted at the close of the year, showing the continued popularity and usefulness of this work. The publication of a further edition was being considered at the close of the year. The usual annual account of the Institution's explorations and field work was issued, and being profusely illustrated, was of considerable popular interest.

Smithsonian report.—The report for 1913 was received from the printer and distributed during the year. Separates of the articles forming the general appendix of the 1914 report were issued, the completed volume, however, not being received from the printer until shortly after the close of the fiscal year. Incorporated in the congressional act providing for printing for the Institution and its branches was a clause increasing the edition of the Smithsonian annual reports from 7,000 to 10,000, a very desirable change, as the edition of this volume has heretofore been exhausted almost immediately following its appearance.

Special publications.—Of the opinions rendered by the Internaional Commission on Zoological Nomenclature, which the Instituion has published for some years past, Opinion 66 was issued, and he Institution has continued to provide clerical services in connecion with the office of the secretary of the commission.

Among other special publications was a short biographical sketch f James Smithson, abridged from the chapter on Smithson by S. P. angley in the history of the first half century of the Institution.

National Museum publications.—The National Museum issued an nnual report, 1 volume of the Proceedings and 41 separate papers orming parts of this and other volumes, 6 bulletins, and 1 volume of ontributions from the National Herbarium.

Bureau of Ethnology publications.—The Bureau of American thnology published two bulletins and three miscellaneous publicaions. Among the latter was a circular of information regarding ndian popular names, to be distributed in response to the numerous etters requesting information of this kind. Four annual reports and ive bulletins were in press at the close of the year.

Reports of historical and patriotic societies.—The annual reports f the American Historical Association and the National Society of he Daughters of the American Revolution were submitted to the nstitution and transmitted to Congress in accordance with the harters of these organizations.

Allotments for printing.—The allotments to the Institution and ts branches under the head of "Public printing and binding" were tilized as far as practicable, although there was a large amount of aterial which the Public Printer was unable to complete, and this ill therefore become a charge against the 1916 allotment.

The allotments for the year ending June 30, 1916, are as follows:

or the Smithsonian Institution: For printing and binding the annual reports of the Board of Regents, with general appendices, the editions of which shall not exceed 10,000 copies	$10,000
or the annual reports of the National Museum, with general appendices, and for printing labels and blanks, and for the Bulletins and Proceedings of the National Museum, the editions of which shall not exceed 4,000 copies, and binding, in half morocco or material not more expensive, scientific books, and pamphlets presented to or acquired by the National Museum library	37,500
or the annual reports and Bulletins of the Bureau of American Ethnology and for miscellaneous printing and binding for the bureau	21,000
or miscellaneous printing and binding:	
International Exchanges	200
International Catalogue of Scientific Literature	100
National Zoological Park	200
Astrophysical Observatory	200
or the annual report of the American Historical Association	7,000
Total	76,200

Committee on printing and publication.—All manuscripts submitted for publication by the Institution or its branches have, as usual, been examined and passed upon by the Smithsonian advisory committee on printing and publication. The committee has also considered various general matters concerning printing and binding. During the year 18 meetings were held and 109 manuscripts acted upon. The personnel of the committee was as follows: Dr. Leonhard Stejneger, head curator of biology, National Museum, acting chairman; Dr. C. G. Abbot, director of the Astrophysical Observatory; Dr. Frank Baker, superintendent of the National Zoological Park; Mr. A. Howard Clark, editor of the Smithsonian Institution, secretary of the committee; Mr. F. W. Hodge, ethnologist-in-charge of the Bureau of American Ethnology; and Dr. George P. Merrill, head curator of geology, United States National Museum.

THE SMITHSONIAN LIBRARY.

The formation of a library of science was one of the earliest activities of the Smithsonian Institution and its natural growth during the last 60 or more years has resulted in the accumulation of nearly half a million works bearing on practically every branch of natural science, the fine arts, and the industrial arts. For administrative reasons a large portion of the library, consisting in the main of transactions of learned societies, was in 1866 deposited in the Library of Congress. This deposit is constantly being increased, the accessions during the past year numbering 24,713 items of publications and making the total number of entries to June 30, 1915, 521,616.

The several libraries still directly maintained by the Institution and its branches include the Smithsonian office library; the libraries of the National Museum, comprising over 100,000 titles; the Bureau of American Ethnology, about 35,000 titles; the Astrophysical Observatory; the National Herbarium; and in addition to these should be mentioned the more recently formed aeronautical library, which contains probably the most complete series of works on this subject in the United States. One of the chief contributors to this library during the year was Dr. Alexander Graham Bell, whose gift included a working library of 46 volumes and 156 volumes of newspaper clippings covering the recent years of rapid development of the art of aeronautics.

Among other accessions to the art section of the library during the year I may mention the loan by Mrs. Walcott of nine volumes of Japanese art and about 400 volumes of architectural publications which formed the library of her brother, Mr. George Vaux, of Philadelphia.

The report of the assistant librarian, appended hereto, describes the improvements recently made by the construction of steel stacks in the Smithsonian building for assembling in accessible quarters many general works belonging to the Government bureaus under the Institution which had heretofore been widely scattered in unsuitable rooms.

LUCY T. AND GEORGE W. POORE FUND.

In my last report I referred to a number of bequests then awaiting settlement. One of these was the bequest of George W. Poore, of Lowell, Mass., who died December 17, 1910, and by the terms of his will made the Smithsonian Institution his residuary legatee. As mentioned in my 1910 report, the estate, estimated at about $40,000, is bequeathed under the condition that the income of this sum should be added to the principal until a total of $250,000 should have been reached, and that then the income only should be used for the purposes for which the Institution was created. Although I have heretofore called attention to Mr. Poore's reason for making this bequest, it is so apt and appropriate that I will repeat it here. The will says:

> I make this gift not so much because of its amount as because I hope it will prove an example for other Americans to follow, by supporting and encouraging so wise and beneficent an institution as I believe the Smithsonian Institution to be, and yet it has been neglected and overlooked by American citizens.

In March, 1915, the Institution received from the executors of the Poore estate the first installment of the bequest, amounting to $24,534.92, as noted under the head of finances. It will be known as the Lucy T. and George W. Poore fund.

THE FREER COLLECTION.

In 1906 Mr. Charles L. Freer, of Detroit, Mich., presented to the Institution about 2,300 paintings and other objects of art, and from time to time since then he has supplemented that gift by further generous donations until this wonderful collection now aggregates 4,811 pieces, including 991 paintings, engravings, lithographs, etc., by American artists, and 3,820 oriental works of art, many of them of high historic and intrinsic value. It was stipulated by Mr. Freer in connection with the gift that the collection should remain in his custody during his lifetime, and that he would provide funds for the erection of a suitable building for the permanent preservation of the collection. He is now considering the question of erecting such a building and a committee of the Regents has been appointed "on the securing of a site for the Freer Art Gallery."

THE NATIONAL MUSEUM.

The report of the Assistant Secretary in charge of the National Museum, hereto appended, indicates most gratifying progress in all lines of Museum activities. To the collections there have been many large and most valuable additions, and installation of exhibits, particularly in the new or natural history building, has been greatly advanced and improved.

More than 300,000 specimens were accessioned during the year, over two-thirds of which pertained to paleontology and zoology, one-sixth to botany, and the remainder to anthropology, geology, mineralogy, textiles, and to other divisions of the Museum.

The ethnological exhibits were enriched by a large series of old Japanese art assembled some 30 years ago by the late J. Crawford Lyon; baskets, musical instruments, and other objects from Dutch Borneo, presented by Dr. W. L. Abbott; also many interesting articles pertaining to the American Indians. In American archeology the principal accession was a series of implements and other objects of stone, metal, and terra cotta from various parts of the United States and Mexico, secured through cooperation with the management of the San Diego Exposition. Dr. Alexander Graham Bell added very greatly to the electrical exhibits by his gift of 280 pieces of experimental apparatus and relics relating to the early history of the telephone.

Special mention should also be made of the gift of Mr. Hugo Worch of a large number of pianofortes, illustrating the progress and development of piano making from about 1770 to 1850. The earliest of European pianos in the series dates from about 1770 and of American pianos about 1790. Many interesting accessions pertaining to American history are mentioned by the Assistant Secretary in his report, as also important additions to the zoological, geological, and botanical collections. A most notable contribution of mollusks, consisting of a very large collection of specimens from practically every part of the world, was a gift from Mr. John B. Henderson, a Regent of the Institution.

As in previous years, much material was received from the United States Geological Survey, the Bureau of Fisheries, the Department of Agriculture, and other Government establishments, these accumulations from various field researches having served their purpose in the preparation of reports on scientific investigations.

The National Gallery of Art has already outgrown the space allotted to the display of paintings. Each year the additions to the permanent collection of paintings, as well as the loan exhibits, causes more and more embarrassment to those in charge of their installan, and the time has now come when serious consideration must be ven to securing adequate quarters for these national collections.

I can not pass without mention of the very interesting exhibition of ces, embroideries, and other art textiles, as also the historical cos- mes, especially those representing the several administrations at e White House since the period of President Washington. I will ot attempt to describe any of the gowns recently received, further an to say that they include a lavender silk dress worn by Mrs. Fill- ore, one of black moiré worn by Mrs. Pierce at the inauguration of resident Pierce in 1853, and a pale green brocade worn by Mrs. leveland during President Cleveland's first administration.

The division of textiles has greatly increased in popular interest rough the installation of a series of machines illustrating methods f manufacture as well as exhibits of the raw and finished products.

Likewise, mineral technology is being illustrated by models and roducts, showing the manufacture of mica plate from material here- fore thrown away as waste, the preparation of asbestos products, d the manufacture of graphite and its industrial products.

The Museum is participating in the expositions at San Francisco d San Diego, although the very small allotment allowed the Institu- n and its branches from the appropriation for Government ex- bits permitted only a comparatively small display at San Fran- co. At the San Diego Exposition, however, for which no appro- iation was granted for Government exhibits, it was possible, ough cooperation with the exposition management, to prepare an eresting exhibit of physical anthropology and one illustrating nerican aboriginal industries. The former exhibit, more fully de- ibed on a previous page, is an entirely novel one. It illustrates n's evolution, his development or growth, his racial, sexual and ividual variations, and the causes, other than normal senility, ich result in the decline of the human organism.

For many years it has been possible to aid the schools and colleges the country in their teaching of natural history through the dis- bution of duplicate material. During the past year 163 sets of ch duplicates, aggregating 14,843 specimens, were thus distributed. d about 8,000 duplicate specimens, nearly three-fifths of which re plants, were utilized in exchanges with other museums and in- tutions.

The total number of visitors to the older Museum building during e year was 133,202, and to the new building 321,712. The latter gregate includes 59,577 Sunday visitors to the new building, the der building not being open on that day.

The Museum issued its usual annual report and series of scientific pers, the total distribution for the year aggregating 54,000 volumes d pamphlets.

BUREAU OF AMERICAN ETHNOLOGY.

The field work of the Bureau of American Ethnology during the last year resulted in the accumulation of a large amount of important data relating in particular to the early inhabitants of the western and southwestern portions of the United States. There was also brought together a great deal of material bearing on the habits, customs, beliefs, institutions, ceremonies, and languages of vanishing tribes of Indians throughout the country. The report of the ethnologist-in-charge, appended hereto, reviews in detail many lines of systematic research now being conducted by the bureau. Among these I may note interesting explorations in New Mexico and Utah among ancient village sites which appear characteristic of peoples probably of a considerable earlier period than those heretofore known from those regions. Ancient earthenware collected by Dr. Fewkes in such sites in the lower Mimbres Valley in New Mexico bear decorations of animals and geometric designs in some measure resembling certain ancient paintings on the walls of caves in France. In southern Arizona are some extensive aboriginal ruins awaiting investigation, which bid fair to add much to our knowledge of the early inhabitants of that region.

Among documents preserved in the Santa Ines Mission in California there has been brought to light an old manuscript of special interest in connection with the study of the former Chumash Indians, and a complete copy of the manuscript has been made for the use of the bureau.

Special researches have been in progress for some years in the preparation of several series of handbooks relating to American Indians. One of these series, devoted to Indian languages, is in course of publication, the first volume already having been issued, under the editorship of Dr. Franz Boas. A Handbook of American Antiquities, the first part of which will soon be ready for the printer, is being prepared by Mr. W. H. Holmes. The "Handbook of American Indians North of Mexico," published some years ago, has had several reprintings, and the public demand for it still continues. A handbook in course of preparation is devoted to Aboriginal Remains East of the Mississippi.

There had been such doubt and discussion as to the probable age of certain Indian mounds in northeastern Kansas and southeastern Nebraska that it seemed important for a representative of the bureau to make an investigation of the facts in the case. This task was undertaken by Mr. Gerard Fowke. His report indicates that instead of dating back many thousands of years, as some had claimed, "it is safe to say that no earthwork, mound, lodge site, or human bones along this part of the Missouri River has been here as long as 10 centuries."

The study and analysis of Indian music is a subject to which the bureau has devoted considerable attention during the last few years, and there have already been published two bulletins on Chippewa music, which have attracted much attention in the musical world. There is now in press an extended account of "Teton Sioux Music" with transcriptions of 240 songs and about 100 illustrations; and a paper on the music of the Ute Indians is in preparation.

The collection of manuscripts pertaining to American Indians which has been accumulated by the bureau during the last 30 years now numbers about 1,700 items. Many of these manuscripts have come to be of priceless value, comprising as they do records which it would be impossible now to duplicate. There was added to this collection during the last year a number of interesting records, including a Laguna Indian dictionary, 49 Arapaho and Gros Ventre notebooks, the war record of "Sitting Bull" depicted in 55 pictographs, and a photostat copy of "A Grammar of the Pottewatomy Language."

The bureau issued two bulletins, and there was in press at the Government Printing Office at the close of the year the twenty-ninth, thirtieth, thirty-first, and thirty-second annual reports, and four bulletins. The completion of several of these works is delayed by the European war, the authors in some cases residing in belligerent countries. The distribution of publications aggregated 10,185 volumes and pamphlets. There were about 500 books added to the library, which now numbers 20,237 volumes, 13,188 pamphlets, and several thousand unbound periodicals.

ASTROPHYSICAL OBSERVATORY.

One of the principal researches by the Astrophysical Observatory during the past year was the continuation of observations as to the intensity of solar radiation at various altitudes, with a view to definitely determine the value of the solar constant of radiation. By means of sounding balloons, to which were attached automatic recording pyrheliometers, successful records were secured up to a height of 25,000 meters or about 15 miles, where the barometric pressure is only one twenty-fifth that at sea level. Director Abbot, in his report and in a special publication (Smithsonian Miscellaneous Collections, Vol. 65, No. 4, June 19, 1915), reviews the observations in solar radiation made at various altitudes from sea level up to the highest practicable mountain peak (Mount Whitney), thence in a balloon as high as man could live, thence to a height of 15 miles, and concludes that the solar constant of radiation is 1.93 calories per square centimeter per minute. Dr. Abbot discusses also the interesting fact that considerable fluctuations of the "solar-constant" values occur from day to day ranging over nearly 10 per cent between the extreme limits, 1.81 and 1.99 calories. In 1913 the radiation of the sun was 2.5 per cent below the mean, and 1 per cent above the mean in 1914. A high average value is said to be indicated for 1915. In concluding his report for the year Dr. Abbot says:

> Short-period fluctuations of solar radiation were large in 1913, but small in 1914. Associated with these quick, irregular fluctuations are found variations of contrast of brightness between the center and edges of the solar disk. Curiously enough, while greater contrast is associated with greater radiation and with numerous sun spots in the general march of the sun's activity, lesser contrast is associated with greater solar radiation in the march of the quick, irregular fluctuations of the sun's emission. This paradox points to two causes of solar radiation—the long period changes may probably be caused by changes of the sun's effective temperature attending the march of solar activity; the quick fluctuations may be ascribed to changes of the transparency of the outer solar envelope.

INTERNATIONAL EXCHANGES.

The operations of the International Exchange Service have been necessarily curtailed for some months because of the European war. The total number of packages handled during the year was 275,756, or 65,911 less than the year before, and their weight was 367,854 pounds, a decrease of 199,131 pounds. There has accumulated, moreover, a large number of packages awaiting opportunity of shipment, particularly to Austria, Belgium, Bulgaria, Germany, Hungary, Montenegro, Roumania, Russia, Servia, and Turkey, which were entirely shut out of the service at the close of the year, although correspondence is in progress to secure renewal of shipment with some of those countries.

One of the important functions of this service is the interchange of official Government documents with various countries, resulting in the building up of a most important division of the Library of Congress. During the past year there was received in this connection from the Chinese Government a set of the Imperial Institute of the Ching Dynasty and other valuable records aggregating 684 volumes.

Fifty-six full sets and 36 partial sets of United States official publications are now sent regularly to depositories abroad, in accordance with treaty stipulations and congressional resolutions. A list of these depositories and detailed statistics of the service are given in the appendix to this report.

INTERNATIONAL CATALOGUE OF SCIENTIFIC LITERATURE.

The Smithsonian Institution has administered the United States Bureau of the International Catalogue since its organization in 1901. There are 33 of these regional bureaus located in the principal counies with a central bureau in London, where reference cards are asmbled and published annually in 17 volumes covering each branch f science. During the past year there were collected and classified the Smithsonian office and sent to London 12,386 cards of reference the scientific literature of the United States for the year 1914, beides 14,027 references for the years 1906 to 1913, or an aggregate of 6,413 cards, making 345,349 references to American literature since 1901.

Through a minute system of classification, the equivalent of a brief digest of the subject contents of each paper, the International Catalogue places before students and investigators references to practically all the scientific literature of the world.

On account of the necessarily high cost of the annual volumes subscriptions to the series are limited as a rule to the most important institutions and libraries, where, however, the catalogue is available to everyone desiring to consult this work.

As in all lines of scientific work, the European war temporarily interferes with the finances and general work of the catalogue and the amount of literature produced in most of the countries at war is greatly curtailed.

NATIONAL ZOOLOGICAL PARK.

There was added to the collections in the National Zoological Park during the past year a number of interesting animals, including 25 species not before represented there. The total accessions aggregated 498. The census of animals on hand June 30, 1915, was 1,397 individuals, representing 151 different species of mammals, 185 of birds, and 22 of reptiles, as compared with 1,362 animals on hand July 1, 1914. The report of the superintendent of the park, on another page, records a detailed systematic list of all the animals, numbering 629 mammals, 696 birds, and 72 reptiles.

Every year since 1890, when the park was established, many specimens have been received through the individual donations of those interested in its growth. Forty-three such donors during the past year contributed 60 animals.

The total number of visitors was 794,530, an increase of about 60,000 over the year preceding, and the largest attendance in the history of the park. Among the visitors were 3,485 students from various schools and classes on special visits to the park for educational purposes.

The superintendent notes among the improvements of the year the construction of a cage and shelter house for pumas; and an out-of-doors inclosure with a small shelter house for a band of 25 rhesus monkeys which thrived there well throughout the winter.

Near the close of the year work was begun on a hospital and laboratory building, the urgent need of which was noted in my last report.

In the sundry civil act making appropriations for the fiscal year ending June 30, 1914, provision was made for the acquisition of about 10 acres of land along the western boundary of the park, but necessary legal proceedings to complete the purchase had not come to a close at the end of the year.

Among the primary objects in establishing the Zoological Park was the "instruction and recreation of the people." To this end the playground department of the District of Columbia has been allowed to install several pieces of apparatus in a meadow tract which has become a favorite resort for picnic parties.

The needs of the park become greater with the growth of the collections and the increasing popularity of the resort as an attractive public institution. The appropriations from year to year, while sufficient for absolute maintenance, have permitted the construction of but few of such permanent buildings as are needed for the adequate care of the animals. Among these urgent needs I may mention an aviary building and a building for the proper housing of elephants, hippopotami, and certain other animals now sheltered in mere temporary quarters.

Accompanying the superintendent's report is an outline map on which are indicated desirable building sites where necessary grading for that purpose would permit the desirable filling of certain ravines now practically useless.

NECROLOGY.

THEODORE NICHOLAS GILL.

Theodore Nicholas Gill was born at New York March 21, 1837, and died at Washington September 25, 1914. The following tribute to his memory was adopted at a meeting of his associates on September 26:

TRIBUTE TO THE MEMORY OF DR. GILL.

Theodore Nicholas Gill, master of arts, doctor of medicine, doctor of philosophy, doctor of laws, associate in zoology in the United States National Museum, died at Washington, D. C., September 25, 1914, in the seventy-eighth year of his age.

His associates in the Smithsonian Institution and its several branches, assembled at a meeting in his memory at the National Museum on September 26, do here record their deep sorrow in the loss of a sincere friend, profound scholar, one of America's foremost men of science, and one officially connected with the Smithsonian Institution in various capacities for more than half a century.

Trained in private schools and by special tutors in New York City, he early acquired a love for natural science which he made his life work, rising to the

hest rank in the field of zoology, and through his critical studies adding
atly to the sum of human knowledge.

s one of the founders of the Cosmos Club; as a professor in the Columbian
w the George Washington) University for more than 50 years; as a member
the American Association for the Advancement of Science, the Philosophical
iety, the National Academy of Sciences, and of many other scientific socie-
s in the United States and foreign lands, Dr. Gill was most highly esteemed
l was widely known to biologists throughout the world as a man of deep
d accurate learning, particularly in the study of his specialty, ichthyology. A
n of phenomenal memory, familiar with many languages, he was a veritable
clopedia of science and knew how to make plain to the layman its technical
raseology. He was a constant and willing source of information and in-
iration to all who sought his aid in professional studies.

Through devotion to his chosen calling and his genial disposition Dr. Gill
s left to his associates a cherished memory and a brilliant example worthy
emulation.

WILLIAM WOODVILLE ROCKHILL.

William Woodville Rockhill, former ambassador to Russia, Tur-
ey, and other countries, one who had ably filled many other im-
ortant diplomatic positions in China, Korea, and elsewhere, and
ad served as Assistant Secretary of State, was born in Philadelphia
n 1854 and died in Honolulu, December 8, 1914. From 1888 to 1892
e conducted two scientific missions to China, Mongolia, and Tibet
nder the auspices of the Smithsonian Institution, resulting in a
arge accumulation of most interesting and important data bearing
n the habits and customs particularly of the then little-known
ibetans. Much of this valuable information was embodied in his
Diary of a Journey through Mongolia and Tibet," published by the
nstitution. To the National Museum collections he added a large
mount of ethnological material resulting from his journeys. Mr.
Rockhill was intensely devoted to oriental study and had been a con-
stant collaborator of the Smithsonian Institution throughout all his
official career. At the time of his death he was en route to assume his
duties as financial adviser to the Chinese Government.

Respectfully submitted.

CHARLES D. WALCOTT, *Secretary.*

APPENDIX 1.

REPORT ON THE UNITED STATES NATIONAL MUSE

SIR: I have the honor to submit the following report on the o tions of the United States National Museum for the fiscal year ing June 30, 1915:

INTRODUCTORY.

In the last two reports the general status and arrangement o public collections in all departments were briefly reviewed. S then the exhibits of anthropology, biology, and geology in the building have undergone few material changes, though they received many important additions and there has been an imp ment in the condition of a large number of specimens which ne renovation. It having become necessary to provide a place fo larger whale skeletons, which were not transferred at the tim the general moving of the zoological collections, the south hall i second story of the west wing, previously assigned to marin vertebrates, was allotted to this purpose and the invertebrates taken to the north side of the building on the same floor. Th installations necessitated by these changes were in progress at close of the year.

The accommodations afforded by the improvised picture ga in the north main hall have been entirely outgrown and the p has been reached where the paintings must be so crowded a utterly destroy their effect. There is no other suitable locatio which this important collection can be extended and would-be tributors find no encouragement in the conditions. The time certainly arrived when serious consideration should be given to providing proper means for sheltering and displaying the art t ures of the Museum, in which connection the interests of the tional Gallery of Art are vitally at stake.

The work of renovation of the main hall in the Smithso building, which continued throughout the year, prevented the cution of the proposed plans for the enlargement and improve of the exhibition series of the graphic arts. In the older Mus building the installations, especially in the recently reorganized visions, steadily progressed with very measurable advancement.

division of textiles much material was added, many gaps were ed, and numerous novel features were introduced. In mineral hnology, where the construction of models makes progress slower, number of comprehensive educational features was nevertheless siderably increased, and so many more are in course of preparation t another year should see a wide representation of the subjects ered. Toward the end of the year a section of wood technology s established with the main object of setting forth in a manner to isfy the artisan and the public the qualities and sources of the ods available for any purpose to which that material is put. It not doubted that a creditable collection can soon be gathered.

COLLECTIONS.

The additions to the collections, comprised in 1,481 accessions, gregated approximately 304,647 specimens, which were classified d assigned as follows: Anthropology, 15,140; zoology, 101,928; tany, 51,295; geology and mineralogy, 4,063; paleontology, 129,981; xtiles and animal and vegetable products, 1,511; mineral technol- gy, 607; National Gallery of Art, 122. Loans for exhibition were so received to the extent of 1,760 articles, consisting of paintings nd sculptures, laces, embroideries and tapestries, costumes and her historical objects, ethnological specimens, etc. The number f lots of material sent in for examination and report amounted to 00, of which about 64 per cent were geological and 28 per cent ological.

Among the more important gifts to the division of ethnology were large series of old Japanese art, assembled about 30 years ago by e late J. Crawford Lyon and presented by the Misses Lyon; a col- ction of baskets, bark cloth, sword hilts in process of making, uivers for blowgun darts, musical instruments, and other objects, athered in Dutch Borneo by Mr. H. C. Raven, and donated by Dr. V. L. Abbott; examples of modern Egyptian clothing contributed y Mr. Herbert E. Winlock; and interesting articles from the Plains ndians, which belonged to the late Maj. George Henry Palmer, nited States Army, presented by Mrs. Palmer. A valuable series f musical instruments, household articles, tools, and other objects rom the Ute Indians of the Uintah and Ouray Reservation, south- astern Utah, was purchased. The loans comprised objects from outhern Mindanao, P. I., Abyssinia, Japan, China, Egypt, and urope.

The principal accession in American archeology was secured rough the cooperation of the Smithsonian Institution with the anagement of the Panama-California Exposition at San Diego, and mprised important series of implements and other objects of stone, metal, and terra cotta from various localities in the United States and Mexico. Many specimens of like nature from the same countries were also received in exchange from the Naturhistoriska Riksmuseum at Stockholm, and the Bureau of American Ethnology transmitted a quantity of pottery displaying a distinct type of decoration from the lower Mimbres Valley, N. Mex. A banner stone of rose quartz, a very remarkable Indian relic and probably one of the finest examples of its kind yet brought to light, from Woodruff County, Ark., and one image of gold and two of gilded copper from Chiriqui, Panama, were purchased. The principal gifts consisted of a notable jade ax from Alta Verapaz, Guatemala, a small stone celt from Ahuachapan, San Salvador, and a clay figurine from Tepecoyo, in the same country, presented by Mr. Emilio Mosonyi, of San Salvador, and a pottery vase from a mound in Marion County, Tenn., contributed by Mr. Clarence B. Moore.

In Old World archeology there were only two relatively important accessions. The first, an exchange from Dr. Rutot, of the Royal Museum of Natural History at Brussels, consisted of 90 Neolithic stone implements from Belgium, representing the first epoch of polished stone culture in Europe, known as the "Spiennian"; the second, a gift from Mr. Herbert E. Clark, of Jerusalem, of 19 stone implements, forming a valuable addition to the present collection from Palestine.

The more important contributions in physical anthropology comprised skeletal material from a Minsi burial place on the Jersey side of the Delaware River, 3 miles below Montague, N. J., one of the most complete and carefully recorded collections of such specimens so far acquired, from Mr. George G. Heye, of New York; similar material from Alabama and Tennessee, from Mr. Clarence B. Moore; eight prehistoric skeletons and four skulls from Bohemia, from Prof. J. Matiegka, of the University of Prague; and three nearly complete and four partial human skeletons, from Montana, collected by Mr. C. W. Gilmore, of the Museum staff.

The electrical collections were enriched by a most noteworthy gift from Dr. Alexander Graham Bell, consisting of 280 pieces of experimental phonographic apparatus and several relics connected with the early history of the telephone. Under a special act of Congress, the Coast and Geodetic Survey transferred a large number of antiquated surveying instruments which are now of much historical importance; and a quantity of guns needed to fill gaps in the collection were deposited by the Navy and War Departments. Of especial interest is a gasoline automobile of 1896, presented by the Olds Motor Works.

The section of musical instruments received during the year such a contribution as places its collection among the most notable of the

d in the world. The gift came from Mr. Hugo Worch, of Wash-
ton, D. C., a student of the history of the pianoforte in America,
o has been assembling a collection of these instruments, which he
ered to the Museum in order to provide for their permanent
eservation. While accommodations for the entire series may not
found, 70 instruments have already been delivered, the selection
llowing lines to best illustrate the progress and development in
ano making down to about 1850. Too much praise can not be
corded Mr. Worch for this splendid donation, which now includes
examples of European make and 46 of American make. With few
ceptions, the latter are the product of manufacturers in Philadel-
hia, New York, Baltimore, and Boston, and represent, among
thers, the names of Taws, Albrecht, Harper, Geib, Kearsing, Loud,
lisky, Osborne, Nunns, Goodrich, Stewart, Chickering, Meyer, Bab-
ock, and Wise. The earliest of the American pianos is of date about
790 and of the European about 1770. While in most cases the ex-
mples are no longer in playing shape, the mechanism is preserved,
nd some remain in excellent condition.

In the section of ceramics the more noteworthy additions con-
isted of two loans, one including an old porcelain rice bowl and a
ea set of cloisonné on porcelain from Miss Julia H. Chadwick, the
ther being a collection of Chinese and Japanese porcelains from
iss Eliza R. Scidmore. The division of graphic arts received
large number of specimens mainly required for filling gaps in the
llections, among the more important being illustrations of a process
r color printing from photographs and of the rapid rotary in-
glio process, besides many examples of lithographs, collotypes,
nd other prints.

The additions to the memorial collection of American history were
umerous and of great variety, the most important being loans, in
hich were included a water-color portrait of Washington by James
eale; articles of military equipment carried by Capt. William Wal-
n during the War of the Revolution; a silver tea service of five
ieces once the property of Laura Wolcott, daughter of Oliver
olcott, a signer of the Declaration of Independence; a pair of gold
nd jeweled earrings formerly belonging to Mrs. Rebecca Madison,
iece of President Madison; and three gold medals and one of
onze added to the collection of Rear Admiral Robert E. Peary,
nited States Navy. There was also a large contribution of silver
d bronze coins of the nineteenth century, issues of the United
ates and several foreign countries; and the collection of postage
mps, envelopes, and post cards was very materially increased.

The exhibition of historical costumes was greatly increased both by
t and loan, most noteworthy being appropriate costumes for repre-
ting four additional presidential administrations at the White

House. The earliest of these belonged to Betty Taylor, daughter of President Zachary Taylor, 1849–1850. The next, a lavender silk dress, was worn at the White House by Mrs. Fillmore, wife of President Millard Fillmore, 1850–1853. The third, a black moiré, was worn by Mrs. Pierce on the occasion of the inauguration of her husband, Franklin Pierce, March 4, 1853. The last, a pale-green brocade, was used by Mrs. Cleveland during the first administration of President Cleveland, 1885–1889.

In the section of art textiles the acquisitions, all loans, comprised over 100 pieces of lace, besides embroideries, brocades, velvets, tapestries, etc. Six tapestries of great beauty and value were also lent for a short period by Messrs. P. W. French & Co., of New York. The room containing this collection was entirely renovated and repainted, the materials were also for the most part rearranged, and where necessary new and more effective backgrounds were substituted.

As during many successive years, the Museum was indebted to Dr. W. L. Abbott for large collections of the higher animals, one made at his expense in Dutch East Borneo by Mr. H. C. Raven, the other, composed entirely of mammals, obtained by himself in Kashmir. Of no less importance was a collection from the northwest coast of Cuba, secured during an expedition by Mr. John B. Henderson, comprising at least 10,000 mollusks and other invertebrates, nearly 3,000 fishes, and many reptiles and batrachians. The Bureau of Fisheries made extensive deposits of marine invertebrates and fishes; and Mr. Arthur de C. Sowerby continued to transmit valuable series of vertebrates and insects from little known districts in China. Birds, reptiles, batrachians, fishes, and marine invertebrates from Panama were contributed by Mr. James Zetek; plants and marine invertebrates in large numbers by the Carnegie Institution of Washington; and animals of various groups by the Biological Survey.

Besides those above mentioned, interesting collections of birds were received from Ecuador and Australia. A unique accession consisted of the last of the pair of passenger pigeons which had been so long preserved in the Cincinnati Zoological Gardens, and whose death signalized the absolute extinction of this remarkable form. Additional specimens of reptiles and batrachians were obtained from Texas, California, Mexico, and Baluchistan; and of fishes from the Philippine Islands, Formosa, and Panama.

The most notable contribution of mollusks was a gift from Mr. John B. Henderson of a very large collection of selected and generally identified specimens assembled from practically every part of the world. Eight separate transfers of invertebrates by the Bureau of Fisheries were of much scientific value. Four of these consisted of material that had been studied and described and therefore contained numerous type specimens, and the remainder of new collections from ent surveys of the steamer *Albatross* on the Pacific coast. rough the courtesy of the Carnegie Institution of Washington, out 1,000 specimens of corals from the Bahama Islands and orida, 300 specimens from Australia, and many other marine forms re acquired. The Bureau of Entomology was the principal con- butor of insects, which belonged mainly to the Hymenoptera, Dip- ra, and Odonata. Peruvian Diptera to the number of over 3,000, sides several hundred preparations, were presented by Dr. C. H. T. ownsend; and numerous wasps and other insects, by Dr. T. D. A. ockerell. Two other important collections, consisting of Coleoptera nd Hymenoptera, were received from Copenhagen.

The number of plants received was greater than in any of the pre- ious 10 years except 1913. Nearly one-fourth were deposited by the epartment of Agriculture, including 7,300 specimens of grasses, of hich the larger part will be distributed in sets to scientific establish- ents. Two other noteworthy collections from the same department onsisted of phanerogams from the western United States and west- rn Canada. Important accessions otherwise obtained came from the West Indies, the Philippine Islands, China, the Canary Islands, western South America, Mexico, and several of the States.

Though the accessions in geology were not extensive, they fur- ished a considerable variety of valuable material. A collection from the Geological Survey was illustrative of the economic phases of the feldspar deposits of the United States. Individual gifts com- prised excellent specimens of ferberite-bearing pegmatite from Ari- ona; tungsten ore and roscoelite-bearing sandstone from Colorado; nd a sample of ferro-vanadium made from patronite ores of Minas- agra, Peru; besides several slabs of marble for the exhibition series of ornamental stones. The meteorite collection was enriched by pecimens from 13 falls, obtained by gift, exchange, and purchase, o which may be added fragments of 12 meteorites deposited by the National Academy of Sciences.

The most important single accession in mineralogy consisted of several hundred specimens of minerals and cut stones, including a suite of unique titantic crystals from an exhausted locality at Bridge- water, Pa., received as a bequest from the late Brig. Gen. William H. Forwood, United States Army. Among the transfers from the Geological Survey were various lots of gem minerals, in both rough and cut form, including many specimens of exceptional value, con- sisting for the most part of types of new species, or restudied and redescribed material from new localities. From several other sources rare and interesting examples were also obtained, such as one of the argest known nuggets of osmiridium, large crystals of phenacite, arbuttite, roepperite, pseudomorphs from the Blue Jay Copper Mine, scheelite, large rhodonites, etc. The additions in petrology consisted, as usual, largely of studied material, representing folio series, deposited by the Geological Survey. Mention should also be made of an interesting collection of obsidians from Iceland, presented by Dr. F. E. Wright, and illustrating his studies on the origin of spherulitic structure.

An extensive series of Devonian fossils, representing the lifelong collecting of Prof. Henry Shaler Williams, and including many faunas not previously represented in the Museum, formed the largest and most important accession in invertebrate paleontology. It was transferred by the Geological Survey, which also deposited nearly 600 specimens of type and other monographic material. Other large acquisitions consisted of about 5,000 specimens of European Paleozoic and Mesozoic fossils; some 6,000 specimens of Ordovician and Silurian fossils from Illinois, Indiana, and Kentucky; and about 5,000 Cambrian fossils from China. A series of Mesozoic sponges from Germany is especially adapted for exhibition purposes, as is also a large slab containing numerous Devonian glass sponges from New York. Additional specimens from the cave deposit at Cumberland, Md., referred to in previous reports, comprising 15 more or less complete skulls and other fragmental material, were obtained through the generous financial aid of Mr. John B. Henderson. Portions of a mastodon discovered at Winamac, Ind., indicate the existence at that place of a more or less complete skeleton, which the Museum has obtained permission to excavate. Other important contributions include 30 dinosaurian skin plates from the Lance formation in Wyoming; a composite skeleton of a dog, and three skulls and lower jaws, from the Rancho La Brea asphalt deposits at Los Angeles, Cal.; and a large part of the skeleton of the extinct swimming reptile, Mosasaurus, from Montana.

The division of textiles received so many and such variety of additions as to render an adequate summation impossible within the compass of this report. Of particular popular interest is a series of machines for ginning, drawing, spinning, and weaving cotton, which it is intended, in part at least, to provide with motive power so as to be able to actually demonstrate to the public the processes of manufacture from the raw material to the finished product. The processes in the manufacture of worsted goods and of carded woolen fabrics are also fully illustrated by a large series of specimens. Besides standard goods of cotton, wool, silk, etc., the contributions include a great array of specialties and novelties, materials recently placed upon the market, or soon to be, in satisfaction of the ever-increasing demand for new stuffs and new patterns. Printed cotton goods, printed cotton draperies, upholstery fabrics; pile fabrics for dress and decorative purpose, including beautiful examples of artificial furs; brocaded dress silks for the fall season of 1915, new printed satins, pongees, tussah silks, trimming silks, taffeta dress silks in Mexican and Indian designs; satins, crêpês, and chiffons decorated by means of spray printing; machine and hand made laces; embroidered and brocaded Chinese silks; Cashmere shawls; the manufacture of American rugs; oilcloths—these and many samples of other goods were all well represented in the accessions of the year. Additions were also received for the historical collection of textile machinery, including several early appliances marking important stages in the development of the industry.

Following the plans outlined in a previous report, the work of preparing exhibits in mineral technology was actively carried on. The principal ones, including models and products, installed during the year were illustrative of the occurrence, mining, and treatment of rock salt for the manufacture of sodium compounds by the Solvay Process Co., of Syracuse, N. Y.; the manufacture of glass, additional to the models received the previous year, from the Macbeth-Evans Co.; the processes employed in the manufacture of gypsum as a building material at Oakfield, N. Y.; the manufacture of mica plate by a process which permits the utilization of what was formerly thrown away as waste; the occurrence, derivation, and adaptability of abrading materials; asbestos fiber and the manufacture of asbestos products; a by-product coke furnace, its operation, and products; and the manufacture of graphite and its industrial products.

THE NATIONAL GALLERY OF ART.

By a supplemental transfer executed in January, 1915, the splendid gift of Mr. Charles L. Freer, of Detroit, Mich., was increased by 110 articles, of which 8 are American and 102 oriental. The American works comprise 1 oil painting by Dwight W. Tryon, 1 oil painting and 2 silver points by Thomas W. Dewing, and 3 drawings and sketches and 1 lithograph by James McNeill Whistler. The oriental objects consist of 43 Chinese and 7 Japanese paintings, mainly panels, kakemono, and makimono; 14 pieces of pottery, of which 12 are Chinese and 1 each Rakka and Raghes; and 24 pieces of jade, 5 sculptures in stone, and 9 bronzes, all Chinese. By this addition the Freer collection now aggregates 4,811 items of American and oriental art.

The other permanent acquisitions numbered 12, of which the principal donor, as heretofore, was Mr. William T. Evans, of New York, who contributed 4 paintings and 1 bronze, namely: "Moonrise at Ogunquit," by H. Hobart Nichols; "Portrait of Mrs. William T. Evans and Son," by Henry Oliver Walker; "Portrait of William T. Evans," by Wyatt Eaton; "Portrait of Wyatt Eaton," by J. Alden Weir; and a bronze bust inscribed "William Thomas Evans

MCMIV," by J. Scott Hartley. The further contributions were as follows: "Wooded Landscape," oil painting, by Samuel Isham, received from the estate of the artist in accordance with his wish; "Fisher Girl of Picardy," oil painting, by Elizabeth Nourse, presented by Mrs. Elizabeth C. Pilling, of Washington, in memory of her husband, the late John Walter Pilling; "Full Moon," a landscape at Limache, Chile, oil painting, by Alfredo Helsby, presented by the Embassy of Chile at Washington; the original plaster model of the bronze equestrian statue of Lafayette, by Paul Bartlett, erected in the Square of the Louvre, Paris, France, in 1900, as a testimonial from the school children of the United States, presented by the artist; a bronze bust, heroic size, of Viscount Bryce, formerly ambassador of Great Britain to the United States, by Henry Hudson Kitson, presented by the artist; a full-length statue of the goddess Sappho, in white marble, typifying the Muse of Poetry, modeled between 1865 and 1870 by Vinnie Ream Hoxie and presented by Brig. Gen. Richard L. Hoxie, United States Army (retired); and the original plaster cast of the statue of The Falling Gladiator, by William Rimmer, presented by his daughter, Miss Caroline Hunt Rimmer.

The loans to the Gallery aggregated 121 paintings, 2 bronzes, and 2 plaster casts, received from 14 sources. Included in the paintings were 27 portraits by 23 artists, forming a special loan exhibition on behalf of The National Association of Portrait Painters, which was held from March 6 to April 7, 1915, a special view by invitation being given on the first evening. This exhibition, like the corresponding one of the year before, was especially noteworthy.

MEETINGS, CONGRESSES, AND SPECIAL EXHIBITIONS.

The facilities afforded by the new building for meetings, lectures, and congresses were extensively utilized. The Washington Society of the Fine Arts continued its lecture courses, which, as customary, were divided into three series, one being on "The art of to-day," another on "The decorative arts," and the third on "The romantic period of music." Seven interesting lectures on various scientific subjects were given, five under the auspices of the Washington Academy of Sciences, and two under the joint auspices of the same organization and the Biological Society of Washington. The Washington Society of the Archaeological Institute of America provided two lectures, as did also the Audubon Society of the District of Columbia.

The National Academy of Sciences during its regular annual meeting in April used the auditorium for its public sessions, which included two lectures under the William Ellery Hale foundation, and also held a conversazione in the picture gallery and rotunda. The annual meeting of The American Fisheries Society took place in September and October, in the course of which two lectures on the salmon industry of the Pacific coast, illustrated by moving pictures, were given. Accommodations were furnished for two conventions. The first was the twelfth annual convention of the National Rural Letter Carriers' Association, held in August, and the second a joint convention of postmasters from Delaware, Maryland, Virginia, and North and South Carolina, which met in October. Two special exhibitions of exceptional interest on July 16, consisted of illustrations of marine life below the surface of the sea at the Bahama Islands by means of moving pictures. The films were the first of their kind known to have been taken, and this was the first occasion of their public display, arranged through the courtesy of the Submarine Film Corporation.

Two receptions were given by the Regents and Secretary of the Institution, the first, on April 17, in honor of the National Society of the Daughters of the American Revolution, the second, on May 13, to the delegates to The American Federation of Arts, then in session in the city. The auditorium and other rooms were used on a number of occasions by branches of the Department of Agriculture for hearings and meetings, including a series of 12 Saturday lectures under the auspices of the Bureau of Plant Industry.

Outside of the National Gallery of Art, the only special loan exhibition of importance held during the year was one assembled under the auspices of The American Federation of Arts. It relates wholly to industrial art in the United States, was opened on May 13, and will continue until the middle of September of the current year. Favored by a very large number of contributors, including manufacturers, craftsmen, artists, and schools, it has proved one of the most notable displays of its kind ever held in this country, and, while not claiming to be complete, it is remarkably comprehensive and representative. The standard upheld is extremely high, and two things are especially emphasized—the value of beauty in design and the fine quality of artistic products now being made in America.

The Museum is participating in the two California expositions, which, beginning in January and February, respectively, will continue until the close of the calendar year 1915. For preparing Government exhibits to be shown at the larger of these, the Panama-Pacific International Exposition at San Francisco, Congress gave $500,000, of which amount the small and inadequate sum of $23,750 was allotted to the Smithsonian Institution and its branches. The representative of these, by designation of the Secretary, is Mr. W. de C. Ravenel, administrative assistant of the Museum. The display made by the Museum has, in view of the circumstance, been almost entirely restricted to ethnology, of which the most prominent features are four large family groups, representing the Alaskan Eskimo, t Zulu-Kaffir of southern Africa, the Caribs of British Guiana, and t Dyaks of Borneo. These are supplemented by a series of 10 abori nal dwelling groups, a large collection of artifacts, and several s noptic series illustrating the history of fire making and illuminati the jackknife, the saw, the spindle and shuttle, and the hafted a perforated stone ax. Outside of ethnology the only material exhi is a splendid group of the common elk, or wapiti, of the Rocky Mo tain region, comprising male, female, and young, but the import Museum exhibits in anthropology, biology, and geology are rep sented by means of an extensive series of lantern slides for use w the stereomotorgraph.

While the Panama-California Exposition at San Diego received aid from the Government, the Museum was enabled to take part a also to derive considerable benefit through a cooperative arrangem between the management of the exposition and the Smithsonian In tution, whereby the latter assumed charge of the assembling a installation of an exhibit of physical anthropology and another ill trating certain important industries of the American aborigines. T expenses were entirely defrayed by the exposition company, wh allotted $27,000 for the former subject and $5,000 for the lat Preparations were begun in 1912, and in physical anthropology, der Dr. Aleš Hrdlička, of the Museum staff, entailed extensive plorations which were carried to many quarters of the globe. T collections as finally installed greatly surpass in richness, instructi ness, and harmony anything before attempted in this line. They divided into four sections, illustrating, respectively, man's evoluti his development or growth; his racial, sexual, and individual va ations; and the causes, outside of normal senility, which contrib to the decline of the human organism, as disease and injury. T other exhibit, prepared under the direction of Mr. William Holmes, head curator of anthropology, consists primarily of six l figure groups, representing the mining of iron ore and pigment ma rials, and of copper, the quarrying of soapstone, obsidian and bui ing stone, and the arrow makers. These groups are supplemented extensive series of the implements, utensils, and art works genera of these ancient peoples. Particular interest attaches to these c lections, as they have been installed as permanent exhibits in a bui ing specially erected as a museum feature for the city of San Die The benefits derived by the National Museum through its partici tion in this exposition consist in the division of a part of the coll tions, the opportunity of reproducing many novel features, and t working up and publication of the scientific results of the expe tions which were mainly into new and important fields.

MISCELLANEOUS.

Duplicate specimens of natural history to the number of 14,843, accurately classified and labeled, and put up in 163 sets, were distributed for teaching purposes among the schools and colleges of the country. They consisted mainly of rocks, minerals, ores, fossils, and recent mollusks, though other zoological groups and ethnological and archeological subjects were also represented. In making exchanges 7,927 duplicates were used, over three-fifths being plants. The number of specimens, all belonging to natural history, sent out for study by specialists located elsewhere, was 10,269, the preponderating subjects being plants, insects, marine invertebrates, and fossils.

The total number of visitors to the new building aggregated 262,135 for week days and 59,577 for Sundays, being a daily average of 837 for the former and of 1,145 for the latter. At the older Museum building the attendance for week days (the building not being opened on Sundays) was 133,202, a daily average of 425. The Smithsonian building was closed to the public during five months on account of extensive alterations in progress, and the attendance was thereby reduced to 40,324 persons.

The publications issued during the year comprised 9 volumes and 41 separate papers. The former consisted of the annual report for 1914; volume 47 of the Proceedings; volume 19 of the Contributions from the National Herbarium; and 6 bulletins, 3 of which related to paleontology and 3 to marine animals. The separate papers formed parts of volumes 47, 48, and 49 of the Proceedings. The total number of copies of Museum publications distributed was about 54,000.

The library received 2,209 volumes, 2,530 pamphlets, and 183 parts of volumes, and at the close of the year contained 45,818 volumes and 76,295 pamphlets and unbound papers, or a total of 122,113 titles.

Respectfully submitted.

RICHARD RATHBUN,
Assistant Secretary in Charge,
United States National Museum.

DR. CHARLES D. WALCOTT,
Secretary of the Smithsonian Institution.

SEPTEMBER 27, 1915.

APPENDIX 2.

REPORT ON THE BUREAU OF AMERICAN ETHNOLOGY.

SIR: Pursuant to the communication of the Acting Secretary dated July 2, I have the honor to present the following report on the operations of the Bureau of American Ethnology during the fiscal year ended June 30, 1915, conducted in accordance with the act of Congress approved August 1, 1914, making appropriations for the sundry civil expenses of the Government, and with a plan of operations submitted by the ethnologist-in-charge and approved by the Secretary of the Smithsonian Institution. The provision of the act authorizing the researches of the Bureau of American Ethnology is as follows:

> American Ethnology: For continuing ethnological researches among the American Indians and the natives of Hawaii, including the excavation and preservation of archæologic remains, under the direction of the Smithsonian Institution, including salaries or compensation of all necessary employees and the purchase of necessary books and periodicals, including payment in advance for subscriptions, $42,000.

SYSTEMATIC RESEARCHES.

As in the past, the systematic researches of the bureau were conducted by its regular staff, consisting of 9 ethnologists, including the ethnologist-in-charge, and of 10 ethnologists during part of the year. These operations may be summarized as follows:

Mr. F. W. Hodge, ethnologist-in-charge, devoted most of his attention during the year to the administration of the affairs of the bureau, but opportunity was found, with the assistance of Miss Florence M. Poast, to add materially to the compilation of the bibliography of the Pueblo Indians, which now comprises about 2,400 titles. Mr. Hodge also read several extended manuscripts submitted for publication by the bureau; he likewise continued to represent the bureau on the Smithsonian advisory committee on printing and publication and the Smithsonian Institution on the United States Geographic Board.

Dr. J. Walter Fewkes, ethnologist, at the beginning of the fiscal year brought to a close his archeological researches in the valley of the lower Rio Mimbres, N. Mex., reference to which was made in the last annual report. These studies of the many village sites of the prehistoric people of the section named lead to the belief that the ient habitations were not terraced community houses, such as racterize typical pueblos, but were of an older form, hence Dr. wkes assigns them to a period and a people which he designates -Puebloan. This conclusion is based not only on the character of house structures as indicated by their ground plans, but also on character and decoration of the pottery vessels found under the rs. The most noteworthy feature of this earthenware is the re-rkable painted decoration on the inside of the bowls, consisting of resentations of men engaged in various pursuits, animals, and metric designs of exceptional forms, suggesting the culture of the res Indians of New Mexico rather than that of other Pueblos. A tinctive feature of some of the animal pictures on the Mimbres tery is the fusion of two different animal forms, as the antelope l a fish, in a single representation. Dr. Fewkes suggests that the ost constant presence of rectangular and other geometric designs the bodies of the animals depicted on the pottery may be con-ered in a sense parallel with certain very ancient paintings on the lls of caves in France, as described by Dr. Capitan and others. e special value of the study of the painted designs on the Mimbres tery lies in the light which they cast on general problems con-ted with the culture-genesis and clan migrations of the sedentary lians of the Southwest. These designs are related, on the one hand, those on Pueblo painted pottery of northern New Mexico and izona and, on the other, to the decorations on the earthenware of prehistoric inhabitants of the valleys of the southern part of the rra Madre Plateau, notably those of the celebrated Casas Grandes Chihuahua. An illustrated preliminary report, under the title rcheology of the Lower Mimbres Valley, New Mexico," was pre-ed by Dr. Fewkes and published in Smithsonian Miscellaneous llections (Vol. 63, No. 10, pp. 1–53, pls. 1–8, figs. 1–32).

n January Dr. Fewkes visited southern Arizona, where he made eral archeological reconnoissances, following the Rio Santa Cruz ost to the Mexican boundary. He visited the old Indian missions San Xavier del Bac and Tumacacori, and in their vicinity examined ensive aboriginal ruins, which were found to belong to the same e as Casa Grande, Ariz. The group of prehistoric ruins near the apidated mission of Tumacacori (which imposing structure, now served as a national monument, is greatly in need of repair) pre-ts unusual advantages for thorough archeological investigation, h promise of important collections. The walls of the compound be traced readily, and if uncovered by excavation would reveal portant information on the ancient culture of the Santa Cruz Val- Similar remains were noted in other parts of this valley and where in southern Arizona. While in this general area Dr. wkes observed that the Papago Indians of the desert have been little affected by civilization, retaining many of their original toms, beliefs, and ceremonies, and a wealth of folklore.

Dr. Fewkes visited also the ruins of a large pueblo compoun the road between Phoenix and Tempe, chiefly for the purpose o termining the advisability of its excavation and repair, as an eff being made by citizens of Phoenix to preserve the ruins with a of having the compound created a national monument and recei adequate scientific treatment.

Leaving Arizona in February, Dr. Fewkes proceeded again t Mimbres Valley, but found the weather unpropitious for field except for excursions with the view of locating sites for possibl ture excavation. He returned to Washington about the middle c month and continued the preparation of his memoir on "Antiq of the West Indies," which is to include the results of archeolo research conducted in the Greater and the Lesser Antilles unde joint auspices of the bureau and the Heye Museum of New Yo referred to in a previous report. In connection with this worl Fewkes visited New York for the purpose of studying recentl quired collections, in the Heye Museum, illustrating the cultu the ancient inhabitants of the West Indies.

The greater part of May was devoted by Dr. Fewkes to the pletion of a paper on "Prehistoric Hopi Pottery Designs," comprises 138 manuscript pages, 12 plates, and 105 figures. I article the author treats of the pictography on the ceramics o ancient village dwellers of the East Mesa of the Hopi of north ern Arizona, including the Keres and Tewa colonists of early t as well as the designs of the more modern period. The memoi siders in detail the probable genesis of modern Hopi symbolic fi and devotes attention also to their connection with clan and sociologic groups.

The opening of the fiscal year found Mr. James Mooney, eth gist, engaged in field studies among the Cherokee Indians of Carolina, which were continued until the middle of September. Mooney devoted his efforts especially to the further collectio translation of the sacred formulas of the Indians named, tog with the collection, for botanical identification, of the plants tioned in the formulas, with others of Indian economic impor The remainder of the fiscal year was spent by Mr. Mooney i office, most of the time being devoted to the final elaboration Cherokee formulas, of varying length, originally written do the priests of the tribe in the native Cherokee alphabet and us them for purposes of medicine, love, hunting, fishing, agricu protection, etc. Each formula consists usually of a prayer or a or both, in an archaic and highly figurative form of the lang followed by brief directions couched in the everyday language

to the manner of the ceremony or the plants to be used in
cription. The printed formula will consist of three parts,
transliteration, translation, and explanation. The glossary
ıprise perhaps 4,000 words, largely archaic and otherwise
in form. The botanical appendix will deal with the names
of from 500 to 700 plants mentioned in the formulas, nearly
hich have already been collected and botanically identified.
ill also be an extended chapter on Cherokee religion and
gy. Approximately a third of the transliterations and trans-
ıave been written in final form from the interlinear note-
ıd half of the work has been glossarized on cards.

lerable time was spent by Mr. Mooney in furnishing special
;ion for use in answering inquiries of correspondents.

ıhn R. Swanton, ethnologist, in addition to supervising the
·k incident to the publication, as Bulletin 45, of "Byington's
Dictionary," edited by himself in conjunction with Mr.
albert, devoted attention to the study of the Creek Indians,
reference is made in former reports. The first draft of his
on the Creeks is practically completed, but the amount of
was found to be so great that it has seemed best to separate
wo, if not three, sections. The first of these, embracing a
ın of the location and classification of the southern tribes,
·ly history, and their population, Dr. Swanton is now revis-
ırporating new material and making such changes as fuller
;ion has shown to be necessary. It is hoped that this section
·eady for publication at a comparatively early date.

gh an Alibamu Indian living in Texas the bureau has been
ıdd several hundred words and a few pages of text to the
material gathered by Dr. Swanton.

g the first three months of the year Mr. J. N. B. Hewitt, eth-
completed the translating and editing of a collection of
l legends for the memoir on "Seneca Myths and Fiction" to
shed in the Thirty-second Annual Report, consisting of ma-
iginally collected in native texts and in English by the late
ı Curtin and Mr. Hewitt. This material, aggregating 2,300
sides 350 notes and additions by Mr. Hewitt, was submitted
October for publication. Subsequently, and as opportunity
rded throughout the year, Mr. Hewitt devoted special atten-
he preparation of material for a grammatical sketch of the
languages, especially as spoken by the Mohawk, Onondaga,
uga, for incorporation in the "Handbook of American In-
guages."

cember Mr. Hewitt visited the Grand River Reservation in
for the purpose of prosecuting his studies among the Indians
; thereon. A serious epidemic of smallpox interfered some-

what with his work, but with the efficient assistance of Mr. Willia K. Loft, a Mohawk speaker, Mr. Hewitt was able to make a critic phonetic and grammatic study of portions of the Mohawk tex relating to the league of the Iroquois, recorded by him in form years. Work was also done in recording a selected list of Mohaw verbs for comparative use, and with the painstaking aid of M Mary Gibson, widow of the late noted chief John Arthur Gibso Mr. Hewitt was able to supply the Cayuga equivalents to this li as well as to record other vocabulary terms of the Cayuga. Fro Mrs. Gibson also was obtained an extended text in Cayuga relati to the origin and the ritual of the death feast of the women. On t same reservation Mr. Hewitt, with the aid of Mr. Hardy Gibson, Cayuga chief, elucidated certain mooted points in regard to t ritual significance of a number of words and phrases employed in t chants of the condoling and installation council of the Iroqu league. From Miss Emily Carrier, a mixed-blood Nanticoke, he o tained a list of 50 Nanticoke words. This short list is of singul interest, as the Nanticoke dialect of the Algonquian stock has beco practically extinct through absorption of its speakers by the Ir quois-speaking peoples. Mr. Hewitt also made about 70 phot graphs, principally of persons.

On his return to Washington on January 15 Mr. Hewitt at on resumed his analytic study of the Mohawk, Onondaga, and Cayu dialects for the purpose of obtaining proper material for the prep ration of the grammatic sketch above referred to.

In addition to these investigations, Mr. Hewitt furnished mu information for use in preparing replies to inquiries from corr spondents, some of them requiring considerable research. No few than 130 such letters were answered by means of data supplied Mr. Hewitt. As in the past, he performed the duties connected wi the custodianship of manuscripts, which required more than the usu time and effort owing to the preparation of more thoroughly fi proof quarters and transfer of the manuscripts thereto, as will lat be mentioned. During June Mr. Hewitt was engaged in reading t first proofs of "Seneca Myths and Fiction."

Mr. Francis La Flesche, ethnologist, was engaged during the ye chiefly in assembling his notes on the No^{n}'zhizho^{n}, or fasting degr of the tribal rites of the Osage called No^{n}'ho^{n}zhi^{n}ga Ie Ita, or Sayin of the No^{n}'ho^{n}zhi^{n}ga. Of the seven degrees, the No^{n}'zhizho^{n} is sa to be the longest and the next in importance to the Níkie degr it is also said that this degree contains nearly all the symbols and ce monial forms (wégaxe), for which reason it is regarded as higher rank than the other degrees, excepting the Níkie. From informati given by Watsémo^{n}i^{n} of the Black Bear gens and by Waxthízhi the Puma gens, both of the Ho^{n}'ga dual division, their version of t ritual of the No^{n}'zhizho^{n} degree is composed of 116 songs, 14 wi (parts of the ritual that is spoken), and a number of ceremonial acts and forms. Waxthízhi, from whom the songs and wígie were obtained, gave 14 wígie and 74 songs; he was unable to give the entire 116 songs, having lost some of them by reason of long disuse of the ritual. To the close of the year 206 pages of this ritual have been completed by Mr. La Flesche; these comprise 9 wígie with literal and free translations, 25 songs with translations, and explanations of the songs, ceremonial acts, and movements, as well as of the various symbols and paraphernalia used in the ceremonies.

Mr. La Flesche's work on the No^n'zhizho^n ritual has twice been interrupted by visiting Osage, from whom, however, further information has been obtained concerning the great war rites of the Osage people. First, Wáthuxage, who visited Washington in the autumn of 1914, gave the ritual of the Waxobe degree of the Tsízhu Washtage gens, of which he was a member. The wígie and songs of this ritual cover 76 typewritten pages, including the music, which has been transcribed from the dictaphone. Besides the Waxobe ritual, Wáthuxage gave, in fragmentary form, the Níkie ritual of his gens; this covers 20 typewritten pages, including the music of the songs, which also have been transcribed from the dictaphone. The translations of the songs and wígie of these rituals have yet to be made and the explanatory texts written. Wáthuxage died in May, 1915.

The second interruption was by Xuthá Wato^{n}i^n and Watsémo^{n}i^n, from whom additional information was obtained. The former gave three of the wígie: Wígie Tonga or Great Wígie, Kíno^n Wígie or Symbolic Painting Wígie, and Wazhóigathe Wígie or Gentile Symbol Wígie, which it was his part to recite at the tribal ceremonies. These cover 37 typewritten pages. Besides the three wígie, Xuthá Wato^{n}i^n gave the ritual of the Níkie degree of his gens. The wígie and songs of the ritual, including the music, comprise 15 pages. The translations of the three wígie, and the wígie and songe of the Níkie ritual, have yet to be made and the explanatory notes assembled. Watsémo^{n}i^n gave another version of the Nídse Waçpe Wígie, or Black Bear Wígie, which he had already given some time ago. This new version is the one recited when the widow of a deceased member of the No^n'ho^{n}zhi^{n}ga is admitted to take his place in the order; it comprises 6 typewritten pages and will form a part of the No^n'zhizho^n ritual. This informant also gave some information concerning his great grandfather, who was a prominent "medicine-man." The notes recorded from the dictation of Watsémo^{n}i^n have yet to be transcribed. The story will form a part of the chapter on the Wako^{n}dagi, or "medicine-men."

Mrs. M. C. Stevenson, ethnologist, continued her researches among the Tewa Indians of New Mexico, but failing health prevented her from completing the final revision of the manuscript of her memoir as she had hoped, and it remained unfinished at the time of her unfortunate death, on June 24, in the suburbs of Washington. It is believed, however, that when an opportunity of fully examining Mrs. Stevenson's completed manuscript and notes is afforded, it will be found in condition for publication after the customary editorial treatment. Mrs. Stevenson was an efficient and industrious investigator of the ethnology of the Pueblo Indians, to which subject she had devoted many years of her life, giving special attention to the Sia, the Zuñi, and the Tewa Tribes. Three memoirs on these Indians, published in the annual reports, are replete with information on the subjects of which they treat, and there is no doubt that when Mrs. Stevenson's memoir on the Tewa Indians finally appears much valuable knowledge will be added to that which she has already given on the sedentary Indians of the extreme Southwest.

With the opening of the fiscal year Dr. Truman Michelson proceeded to Wisconsin in the hope of obtaining ethnologic and linguistic information regarding the Stockbridge Indians residing in that State. It was found that, with respect to the language of this remnant tribe, about a dozen members remembered isolated words, but only one could dictate connected texts, half a dozen of which were recorded. Although knowledge of the language is now too limited to enable restoration of the grammar, enough material was obtained to show that Stockbridge was intimately related to Pequot and Natick, as well as to Delaware-Munsee. The Stockbridges have long since abandoned all their native customs and beliefs, consequently their ethnology may be regarded as beyond recovery.

While in Wisconsin Dr. Michelson procured also ethnologic and linguistic notes on the Menominee. A visit to the Brotherton Indians resulted in the acquirement of little information excepting historical data, as these people have become greatly modified.

Dr. Michelson next visited Tama, Iowa, for the purpose of renewing his researches among the Fox Indians, to which he has been devoting his energies for some time. He was especially successful in obtaining accounts of the mythical origin ascribed to the Fox people, given in the form of rituals, and he gave attention also to the phonetics of the Fox language. A noteworthy result of Dr. Michelson's Fox investigations was the acquirement, through Horace Poweshiek, of a complete translation of the two most important Fox myths—the Culture Hero and Mother of All the Earth.

At the request of the Davenport Academy of Sciences, Dr. Michelson conducted some archeological excavations for that institution at its own expense, leave of absence having been granted him for that purpose. En route to Washington, he examined the Sauk and Fox collections in the Field Museum of Natural History at Chicago.

In the office Dr. Michelson paid special attention to the observaons on the Sauk and Fox by early writers, especially by the authors the Annals of the Propaganda Fide, and by Marston, Long, arver, Beltrami, and others. With the view of definitely settling the uestion of the relationship of the Yurok and Wiyot languages of alifornia to the Algonquian linguistic stock, Dr. Michelson devoted urther study to the subject, reaching the conclusion that whether or ot further material would prove these languages to be divergent nembers of Algonquian, the existing data do not warrant such a lassification. Dr. Michelson also devoted attention to the linguistic lassification of Potawatomi, based on certain grammatical treatises y the late Father Gailland in possession of St. Mary's College at St. Marys, Kans., which the bureau was permitted to copy through he courtesy of Rev. George Worpenberg, S. J., librarian of the colege. By these studies Dr. Michelson concludes from the verbal proouns of Potawatomi that it belongs to the Ojibwa division of the entral Algonquian languages, but that the language is further renoved from Ojibwa, Ottawa, and Algonkin than any of these is from he others.

Mr. John P. Harrington, ethnologist, became a member of the taff of the bureau, with the approval of the Civil Service Commision, on February 20, from which time until the close of May he inished 600 pages of manuscript and more than 3,000 slips of inguistic information regarding the Chumash Indians of California, he result of researches conducted by him before entering the service f the bureau. He also has, in various stages of elaboration, a quanity of other Chumash ethnologic and linguistic material in the preparation of which for publication satisfactory progress is being made. At the end of May Mr. Harrington proceeded to Santa Ines Mission, where, among its documents, he found an old manuscript bearing the title "Padron que contiene todos las Neofitas de esta Mision de la Purisima Concepcion con expresion de su edad, y partida de Bautismo segun se halla hoy dia 1° de Enero de 1814," by Father Mariano Payeras, of the greatest importance to the study of the former Chumash Indians of La Purisima and Santa Ines. A complete copy of this splendid manuscript, which does not seem to have been known to historians, was made by Mr. Harrington, who also extracted a considerable amount of other material from the mission records. While at Santa Ines Mr. Harrington located the site of the former large rancheria of Nojoguí (which had not before been known), and also the site of the rancheria of Itias, mentioned in the records. On June 19 Mr. Harrington visited Arroyo Grande, where he worked for a week with a poor, sick old woman, the sole survivor of the San Luis Obispo Indians, for which reason, to use Mr. Harrington's own expression, "the words of her language are precious beyond the power of money to buy," especially as her speech is the most archaic of all the Chumashan dialects. For the convenience of his field studies Mr. Harrington has established headquarters at Los Angeles, where he has been granted the facilities of the Southwest Museum by the courtesy of its officials.

SPECIAL RESEARCHES.

The preparation of the second volume of the "Handbook of American Indian Languages," under the editorship of Dr. Franz Boas, honorary philologist, has progressed slowly, on account of the impossibility of sending proofs to Russia, where the author of the section on the Chukchee and Eskimo resides. The chapter on Siuslaw, by Dr. Frachtenberg, has been corrected and made up in pages, forming pages 431 to 605 of the second volume. At the beginning of the year Dr. Boas concluded his collection of Kutenai material, which was studied preliminary to the writing of the grammar of this language. The texts collected by him were written out, and the completed manuscript, consisting of 263 pages of Indian texts and 269 pages of translation, has been submitted and set in type, forming 125 galleys. The texts include some material collected by the late Dr. A. F. Chamberlain, which was acquired by the bureau and was revised by Dr. Boas.

Much time has been spent by Dr. Boas in work on his memoir, "Tsimshian Mythology," to accompany the thirty-first annual report. During the fiscal year 1913–14 the tales themselves had been set up. During the year now under consideration the manuscript of the discussion of this material was completed and put in type; it forms pages 394 to 867 of the annual report. In the mechanical work of preparing the manuscript Dr. Boas was assisted by Miss H. A. Andrews, who, besides the preparation of manuscript and proof reading, did much of the laborious work of extracting and collating material needed for the investigation.

The manuscript on Eskimo mythology, intrusted to Waldemar Bogoras and accepted for publication, together with an introduction by Mr. Ernest Hawkes, is held in abeyance, owing to the impossibility at the present time of communicating with the author in Russia.

Dr. L. J. Frachtenberg, special ethnologist, left Washington on July 6, 1914, going directly to Oregon for the purpose of concluding his investigations of the language, mythology, and culture of the Kalapuya Indians, commenced during the previous fiscal year. After a short trip to the Siletz and Grand Ronde Agencies in northwestern Oregon for the purpose of interviewing all available informants, he proceeded to Chemawa, Oreg., where he conducted his Kalapuya investigations until December, and completed them at the Grand Ronde Agency between December 13 and 20, which time was spent chiefly in the collection of linguistic material for a comparative study of the Kalapuya dialects. Special attention was given to the Yamhill and Yonkalla variations. Dr. Frachtenberg's field work proved highly successful. He obtained 30 myths, tales, historical narratives, and ethnographic descriptions, told in the various Kalapuya dialects, an unusually large amount of grammatical notes, sufficient material for a linguistic map showing the original distribution of the several Kalapuya dialects, and some data on Kalapuya ethnology. A glance at this material reveals some interesting facts: The Kalapuya Indians in former times were the most powerful and numerous family of Oregon. They claimed the whole of the fertile valley of the Willamette, extending from the Coast Range to the Cascade Mountains, their settlements reaching as far north as the present Portland and as far south as the middle course of Umpqua River, an area of approximately 12,000 square miles. These Indians were placed on the Grand Ronde Reservation in 1857, at the close of the Rogue River war. Previous tribal wars and frequent epidemics of smallpox and other infectious diseases have reduced the Kalapuya tribes to such an extent that Dr. Frachtenberg has found but a mere handful of survivors, hence the time is not far off when the stock will become extinct.

The Kalapuya family embraces a large number of tribes, the most important of which are: (1) Atfalati (or Wapato Lake), living formerly on the banks of the Tualatin River; (2) Yamhill, claiming the banks of the river of the same name; (3) Lakmayuk, who obtained their name from the river Luckiamute; (4) Marys River (Calapooia proper), whose settlements were situated along the banks of the Calapooia and Marys Rivers; (5) Yonkalla, the most southerly Kalapuya tribe; (6) Ahantsayuk, also called Pudding River Indians; and (7) Santiam, who formerly lived on the banks of Santiam River. These tribes speak varieties of the Kalapuya language, which show remarkable lexicographic diversities. Morphological differentiations exist also, but are chiefly of a phonetic nature. All differences between the dialects seem to have been caused by a geographic distribution, resulting in the three subdivisions mentioned in the last annual report. Long and continued contact of the Kalapuya Indians with white settlers has resulted in a complete breaking down of the native culture and mode of living; consequently the ethnologic data obtainable were very meager and in most cases were given as information obtained through hearsay.

In the early part of January Dr. Frachtenberg made a short trip to the Siletz Agency for the purpose of settling a few questions pertaining to Alsea phonetics. In view of the fact that the allotment made for his field researches during the fiscal year became exhausted Dr. Frachtenberg was obliged to remain in the field until the close of June. On January 15 he resumed the work of preparing a grammatical sketch of the Alsea language, which was finished late i May; this consists of 158 sections, approximating 600 manuscrip pages. During June he was engaged in typewriting this grammat cal sketch, which will be published in part 2 of the "Handbook c American Indian Languages."

In addition to his field investigations Dr. Frachtenberg correcte the proofs of his grammatical sketch of the Siuslaw language, sp cial attention being given to the insertion of the proper referenc taken from his Lower Umpqua texts, printed in the Columbia Un versity Contributions to Anthropology.

Mr. W. H. Holmes continued the preparation of the "Handbook American Antiquities" whenever his exacting duties in behalf of th National Museum permitted. Part 1 of this work is well advanc toward completion; much attention has been given to part 2, and th preparation of the numerous illustrations is well in-hand.

During the month of July, Mr. Gerard Fowke was engaged, und instructions from the bureau, in making limited archeological i vestigations in northeastern Kansas and southeastern Nebraska, th purpose of which was to ascertain the value of certain recent dete minations regarding the age of the prehistoric aboriginal occupan of this region. Respecting the large mounds, the age of which h been under discussion, Mr. Fowke reports that three points must taken into consideration in fixing a definite age for these remains, follows:

1. The relics found in and around the lodge sites, except for the markin on some of the pottery, are in no wise different from those found on the si of villages which were occupied when Lewis and Clark came through here.

2. Fairly solid bones of animals, and occasionally human bones, are fou in the bottoms of the lodge sites, even where these are damp most of the ye In the pits, where such remains are preserved by ashes, this would not me much; but where they are found in clayey earth it is evident that "thousan of years" is a meaningless term to apply to them.

3. Persons who claim these "thousands of years" for pretty much everyth they find in the ground, must explain why it is that while the bones and imp ments of these assumed "ancients" are found in such quantities and in s good preservation, those of later Indians should have entirely disappeared.

The only tenable theory of age is the amount of accumulation in the depr sions of the lodge sites. Above the clay which formed the roof, and is n to the floor now, is a depth of material sometimes, it is said, as much as or even 22 inches of mingled silt, decayed vegetation, and soil from the s rounding wall. It is used as an argument of age; that as these sites a hilltops where there can be no inwash, this depth must indicate a very re period for their construction. But a large amount of the earth thrown out i the surrounding ring or wall will find its way back into the depression. T water will stand in them a good part of the year, and the soil remain da even in prolonged drought; vegetation is thus more luxuriant than on the o side, and its decay will fill up rather rapidly. In addition, much sand blo

> the prairies as well as from the bottom lands, and whatever finds its way
> the pit will stay there; it will not blow away again, as it would in
> ground. Weeds also will catch and retain much of this dust, which would
> on over a dry surface. Consequently the allowance of an inch in a
> ry, which is the most that advocates of great age will allow for accumu-
> , is too small.
>
> topography of the region was essentially the same when these remains
> constructed as it is now. The hills and valleys were as they now exist;
> osion has been very slight as compared with that which has taken place
> the loess was brought above the water to which it owes its origin. This
> nent is fully proved by the position of the mounds and lodge sites. Any
> ate of age must be only conjecture at best; but it is safe to say that no
> work, mound, lodge site, or human bones along this part of the Missouri
> has been here as long as 10 centuries.

ith regard to the discoveries of human remains at exceptional
hs in loess formations on Longs Hill, near Omaha, Mr. Fowke
s that excavation of the site has been so exhaustive that further
tigations are out of the question, and that determinations of age,
fore, must rest, in the main at least, with the published state-
s of the original explorers.

iring recent years observers have reported the existence of
nds and other evidences of prehistoric occupancy in western
ı; these reports, however, contained little definite information
rding the character of existing ruins and described only briefly
artifacts associated with them. The possible relationship of
remains with those of the ancient pueblo dwellers of Arizona,
Mexico, and Colorado suggested the necessity of a preliminary
iination of the western Utah field, with the view of determining
ıature and range of former settlements, and also the desirability
ıore detailed investigations. This work of reconnoissance was
menced by the bureau in May and extended through the close of
fiscal year, the field observations being made by Mr. Neil M.
l, of the National Museum. A group of small mounds near Wil-
, on the northeastern shore of Great Salt Lake, were first exam-
. Many other mounds in this locality have been completely
royed by cultivation during recent years, and of those remaining
how modifications resulting from recent tillage. Four mounds
selected for special investigation, and from these sufficient in-
ıation was gathered to indicate the chief characteristics of the
iitive dwellings over which the mounds had accumulated.

ollowing the work at Willard, an examination was made of
in well-defined mounds on the outskirts of Beaver City, in
er County, where three house sites of the Willard type were
d in close proximity to larger mounds containing groups of
llings. Two weeks' work resulted in the complete excavation of
house group comprising 16 rooms and the partial examination
still larger group. The Beaver mounds, like those at Willard,

have resulted from the gradual accumulation of drifting sand and dust over the fallen walls of more or less permanent dwellings. Unlike the isolated structures at Willard, however, the mounds at Beaver City disclosed groups of associated rooms, arranged with some degree of regularity and exhibiting a certain unity of purpose. In each of the two groups studied, small series of contiguous rooms were uncovered, but the majority were single compartments separated from the other dwellings by varying distances. The walls of these primitive dwellings at Beaver were built of adobe, sometimes placed in wide layers but more often forming a solid mass. No openings that could be identified definitely as doors were found in any of these walls; this fact, together with the comparative abundance of circular stone slabs, leads to the belief that entrance to the dwellings was gained through roof openings which could be closed with the stone disks. Post holes in several floors, with charred fragments of cedar logs, and masses of clay bearing impressions of logs, willows, and grass, give a fairly complete indication as to the nature of the roof construction. Large timbers crossed in the direction of the shorter dimensions, their ends resting upon the side walls of the rooms; when necessary these were supported by upright timbers. The roof beams in turn supported lesser timbers with layers of willows and grass. Layers of clay, varying in thickness from 1 inch to 6 inches with the unevenness of roof materials, covered the grass, thus completing a truly substantial shelter.

Four small mounds, similar to those at Beaver City, were excavated at Paragonah, in Iron County. These contained one room only, but there are larger mounds in the vicinity whose superficial indications suggest as many if not more rooms than the group at Beaver. Twenty years ago, it is reported, there were about 100 mounds in this vicinity; to-day more than half of them have disappeared through cultivation of the soil.

A brief examination was made by Mr. Judd of several house sites overlooking the Rio Virgen, near St. George, in the extreme southwestern corner of the State. From this village eastward to Kanab only a few mounds were noted, although cowboys reported the existence of others in the vicinity of Short Creek, on the Utah-Arizona line.

From Kanab as a base, the mounds in Johnson Canyon and the small cliff houses in Cottonwood Canyon were visited and partially examined. From superficial observations the former were judged to contain the remains of house structures similar to those at Beaver and Paragonah, although the availability of suitable stone for building purposes has resulted in its partial substitution for adobe, with certain accompanying structural modifications.

Several caves in Cottonwood Canyon 12 miles westward from Kanab contained evidences of human occupancy. The walls of nearly all bear pictographs of more than ordinary interest, and three of the caves visited sheltered the remains of small dwellings, the most interesting of which is a group of four detached rooms and one circular kiva. The walls of these are of stone with a rather greater proportion of mud plaster than is common in cliff dwellings of the Southwest. The ceremonial room measures 14 feet in diameter, but, except in its lack of recesses, does not differ greatly from similar structures in ruins previously reported throughout the San Juan drainage.

Mr. Judd's preliminary observations among a limited number of ruins in western Utah indicate the former existence of a people whose dwellings developed in natural sequence from single earth-covered shelters, such as those at Willard, to groups of more permanent structures like those at Beaver, Paragonah, and elsewhere, and finally to allied cliff houses similar to those in Cottonwood Canyon. The construction of these several types of houses and the character of the artifacts found in them point to close relationship between their builders and the better-known pre-Puebloan peoples of New Mexico, Arizona, and Colorado. Whether these primitive structures in Utah actually antedate the communal dwellings in the States named or whether they represent an offshoot from the more highly developed Pueblo culture is a point not yet determined. The relationship is certain, however, and future investigation may be expected to determine its limits. It is hoped that the opportunity to continue this investigation may soon be afforded, as the progress of agriculture in most of the areas investigated by Mr. Judd is resulting in the rapid disappearance of all superficial evidences of aboriginal occupancy.

En route to Washington from Utah, Mr. Judd spent a day at the so-called "Spanish diggings," the ancient quarries in Wyoming where generations of western Indians quarried the flint and chert utilized in the manufacture of various weapons and household implements.

Excellent progress has been made in the study and analysis of Indian music, to which subject Miss Frances Densmore has devoted special attention. The principal work in this direction has been the completion of the manuscript on "Teton Sioux Music," consisting of 1,067 pages, in addition to transcriptions of 240 songs and about 100 illustrations. This material was submitted in June for publication. Miss Densmore also made considerable progress in the preparation of a paper on the music of the Ute Indians, 92 pages of manuscript, 28 transcriptions of songs, 11 analyses of songs, and 8 original photographic illustrations being submitted. This work is not yet finished.

Mr. D. I. Bushnell, jr., has continued the preparation of tl "Handbook of Aboriginal Remains East of the Mississippi," under small allotment by the bureau for this purpose, and has made steac progress. During the year circulars were addressed to county of cials in those sections from which no information had been receive and good results were obtained. The thanks of the bureau are d Mr. Arthur C. Parker, State archeologist of New York, for a lar body of valuable data regarding the archeological sites in New Yor and to Mr. Warren K. Moorehead, of Phillips Academy, Andove Mass., for similar information respecting aboriginal remains in tl State of Maine, derived from his personal observations.

Mr. James R. Murie, as opportunity offered, continued his studi of the ceremonies of the Pawnee Indians, under a small allotme by the bureau. During the year Mr. Murie submitted, as a result these investigations, a manuscript of 266 pages on "The New Fi Ceremony" of the Pawnee.

Dr. A. L. Kroeber, of the University of California, has made go progress in the preparation of the "Handbook of the Indians California." At the inception of this work it was believed pra ticable to confine the treatment to a very limited number of page By reason of the great diversity in the languages and the culture the Indians of California, past and present, however, it was foun that no adequate treatment of the subject was possible within tl limits originally prescribed, consequently the handbook when pul lished will comprise approximately 200 pages. Dr. Kroeber expec to submit the manuscript in readiness for publication in the earl part of 1916.

The "List of Works Relating to Hawaii" has been added to fro time to time by the surviving compiler, Prof. Howard M. Ballo of Honolulu. Mr. Felix Neumann has devoted attention to its ed torial revision, but it was found at the close of the year that mu work of a mechanical nature remained to be done before plans f publication could be completed.

MANUSCRIPTS.

As in the past the valuable collection of manuscripts of the bure has been in the immediate custody of Mr. J. N. B. Hewitt, who work in this direction was considerably increased by reason of tl necessity of returning the manuscripts to the newly fireproofed roo in the north tower of the Smithsonian building and reclassifyi them. For the first time the manuscripts of the bureau, which no number about 1,700 items, many of which are of priceless value, a believed to be safe from possible fire, being contained in steel cas or on steel shelves, surrounded by brick, cement, and terra-cotta wall floor, and ceiling. In addition to manuscripts submitted for imm liate publication or elsewhere referred to in this report, the following accessions were made during the year:

Laguna Indian Dictionary. Deposited by the wife and son of the late John Dunbar, of Bloomfield, N. J.

Dr. A. L. Kroeber. Forty-nine Arapaho and Gros Ventre notebooks, six ackages of slips containing an Arapaho vocabulary, and a carbon copy of a tudy of Arapaho dialects.

War record of Sitting Bull, depicted in 55 pictographs, with a letter of uthentication. Deposited by Dr. D. S. Lamb, of the Army Medical Museum.

J. P. Dunn. The third part of the translation of the anonymous Miami-Peoria Dictionary, the original of which is in the John Carter Brown Library it Providence, R. I.; 36 pages, *Assomer* to *Bercer*.

Photostat copy of "A Grammar of the Pottewatomy Language," by Rev. Maurice Gailland, the original of which is in possession of St. Mary's College at St. Marys, Kans.; 452 pages.

Note should here be made of the great usefulness of the photostat apparatus acquired by the bureau during the last fiscal year, which has enabled the photographic copying at slight cost of various manuscripts, field notes, and rare books and pamphlets needed for reference in the researches of the bureau. These copies have been made in the photographic laboratory of the bureau by Mr. Albert Sweeney, assistant to Mr. De Lancey Gill, illustrator.

PUBLICATIONS.

The editorial work of the bureau has been continued by Mr. J. G. Gurley, editor, who from time to time has been assisted by Mrs. Frances S. Nichols. The publications issued during the year were:

Bulletin 46. "Byington's Choctaw Dictionary," edited by John R. Swanton and Henry S. Halbert.

Bulletin 58. "List of Publications of the Bureau," which appeared in August, 1914, with a second impression in May, 1915.

Miscellaneous publications:

No. 10. Circular of Information Regarding Indian Popular Names.

No. 11. Map of Linguistic Families of American Indians North of Mexico. This map, which is a revision of the linguistic map published in Bulletin 30 (Handbook of American Indians), was reprinted in advance from the plate in the report on "Indian Population in the United States and Alaska," subsequently published by the Bureau of the Census.

No. 12. List of Indian words denoting "man," prepared in placard form for use in the Smithsonian exhibit at the Panama-Pacific Exposition.

The status of other publications now in press is as follows:

Twenty-ninth annual report. The "accompanying paper" of this report is "The Ethnogeography of the Tewa Indians," by J. P. Harrington, a work presenting many technical difficulties. The solution of these was retarded by the illness of the author, which resulted in his incapacity for several months to deal with the various questions arising in connection with the text. The reading of the proof has been carried forward as rapidly as circumstances would permit, and at this time the entire report is paged with exception of the list of place names, 2,650 in number, and the index. Considerable progress has been made in the final reading of the page proof. The number of pages in the volume (estimated) will be 660, with 21 plates, 31 maps, and 1 diagram.

Thirtieth annual report. This report, which contains as "accompanying papers" "The Ethnobotany of the Zuñi Indians," by Mrs. M. C. Stevenson, and "Animism and Folklore of the Guiana Indians," by Walter E. Roth, has been "made up" and read through three page proofs. At the end of the year the report (453 pages) was practically ready for the bindery.

Thirty-first annual report. With this report is incorporated a memoir on "Tsimshian Mythology," by Dr. Franz Boas. Of this material less than half (365 pages) had been paged at the beginning of the fiscal year. With the progress of the work a large amount of new matter has been inserted, necessitating considerable revision from time to time and the reading of several galley and page proofs of the greater part of the memoir. At this writing the make-up has been carried through page 682, and Dr. Boas looks forward to paging the remaining material at an early day. The memoir will contain in all about 850 pages, with 3 plates and 24 text figures.

Thirty-second annual report. The memoir accompanying this report is entitled "Seneca Fiction, Legends, and Myths," the material of which was collected by the late Jeremiah Curtin and J. N. B. Hewitt and edited by the latter. The manuscript reached the bureau for publication about the middle of October and when the fiscal year closed more than one-fourth (82 galleys) had been set up. The number of pages will approximate 900.

Bulletin 40. "Handbook of American Indian Languages," part 2 (Boas). During the year two sections of the above-named handbook have received attention—the Chukchee (Bogoras) and the Siuslaw (Frachtenberg). After the former had been put into page form to the extent of 50 pages work thereon had to be suspended by reason of the impossibility of communicating with the author of the section, who is in Russia. The Siuslaw section (75 galleys) is now at the Government Printing Office for paging. Two of the "illustrative sketches" of part 2 of this bulletin, namely, Takelma (Sapir), 298 pages, and Coos (Frachtenberg), 133 pages, have already appeared in separate form.

Bulletin 55. "The Ethnobotany of the Tewa Indians" (Robbins, Harrington, and Freire-Marreco). After the manuscript of this bulletin had been prepared by the other authors here named and had passed into galley proof, Miss Freire-Marreco incorporated therewith additional material to the extent of greatly enlarging and practically recasting the memoir. Subsequently, on account of the European war it was found impracticable to get from Miss Freire-Marreco the proof sent to her for correction and in the absence of her revision the task of putting the bulletin into final form has proved difficult. Half of the material, however, has been paged and it will be possible to complete the work in the near future.

Bulletin 57. "An Introduction to the Study of the Maya Hieroglyphs" (Morley). The first proof of this publication bearing the author's corrections reached the bureau the middle of September. Since then two additional proofs have been revised, the character of the material being such as to require great care and exactness in the work. The author is now engaged in a final reading of the pages. Unfortunately the progress of the work has been delayed several months by his absence in Central America. The volume will contain, when completed, about 320 pages, with 32 plates and 85 figures.

Bulletin 59. "Kutenai Tales" (Boas and Chamberlain). The manuscript of this bulletin was received in March and, after being edited, was placed in the hands of the Public Printer. By the middle of June the first proof, complete (125 galleys), had been forwarded to Dr. Boas.

ulletin 61. "Teton Sioux Music" (Densmore). The material of this bulle- comprising 1,067 pages of manuscript, and copy for 80 plates, 20 text res, and 263 folios of music, was approved for publication in June, too : for inclusion by the Printing Office under the bureau's allotment for this al year.

ls during the last few years, the correspondence arising from the ge demand for the publications of the bureau has been in the im- diate charge of Miss Helen Munroe and Mr. E. L. Springer, of ; Smithsonian Institution, assisted during part of the year by Mr. iomas F. Clark, jr., and later by Mr. William A. Humphrey. The stribution has been made, in accordance with law, by the superin- ndent of documents on order of the bureau. The total number of iblications issued during the fiscal year was 10,185, distributed as llows:

inual reports	1,239
illetins	8,515
ontributions to North American Ethnology	25
troductions	8
iscellaneous	398
Total	10,185

This total shows a decrease of 2,634 volumes in comparison with ie year 1913–14, due largely to the retention in the transmission of ertain publications to Europe by reason of the war.

ILLUSTRATIONS.

The preparation of illustrations for the publications of the bureau nd of photographic portraits of the members of visiting Indian eputations has continued in charge of Mr. De Lancey Gill, illus- rator, assisted by Mr. Albert Sweeney. The photographic work uring the year may be classed as follows:

ortrait negatives of visiting delegations (Crow, Osage, Chippewa, and Sioux Tribes)	10
egatives of ethnologic subjects to illustrate publications	52
evelopment of negatives exposed by field parties	548
hotographic prints for distribution and for office use	690
hotographic prints for publication and for office use	120
hotographic prints for exhibition purposes	115
mall photographic prints distributed chiefly for scientific purposes	350
rawings prepared for illustrations	30
hotostat copies (pages) of books and manuscripts	1,452

In addition Mr. Gill gave the usual attention to the critical exami- ation of engraver's proofs of illustrations designed for the publica- ions of the bureau, submitted by the Public Printer.

In the last report mention was made of a series of photographs f Indian subjects that has been exhibited successively by the New ork Public Library, the Library Commission of Indiana, and the rovidence Public Library. In September, 1914, in response to the request of the Public Library of Haverhill, Mass., this series of pictures was sent for public exhibition in that library. In addition, collections of photographs of Indian subjects, designed to illustrate in part the work of the bureau, were sent for exhibition at the Panama-Pacific Exposition in San Francisco and at the Panama-California Exposition in San Diego.

LIBRARY.

The reference library of the bureau has been in the continuous charge of Miss Ella Leary, librarian, assisted by Mrs. Ella Slaughter until her death on November 1, 1914, and subsequently by Charles B. Newman, messenger boy. During the year 997 books were accessioned, but of this number only 448 were newly acquired, the remainder being represented by the binding and by entry on the records of serial publications that had been in possession of the bureau for some time. Of these accessions 138 volumes were acquired by purchase and 310 by gift or through exchange. The serial publications currently received number about 700, of which only 17 are obtained by subscription, the remainder being received by exchange of the bureau's reports and bulletins. Of pamphlets, 294 were acquired. The number of volumes bound was 678. The library contained 20,237 volumes, 13,188 pamphlets, and several thousand unbound periodicals at the close of the year. The number of books borrowed from the Library of Congress for the use of the staff of the bureau in prosecuting their researches was about 450.

The new steel bookstacks in the eastern end of the main hall of the Smithsonian building, referred to in the last annual report, were finished and placed at the disposal of the bureau in August, when the work of reinstallation of the library was undertaken by the librarian and promptly carried to completion. The facilities afforded by the new stacks are an improvement over those of the old library equipment, while safety is greatly increased.

COLLECTIONS.

The following collections were acquired by the bureau or by members of its staff and transferred to the National Museum, as required by law:

Model of Cherokee packing basket from the East Cherokee Reservation, Swain County, N. C. Collected by James Mooney, Bureau of American Ethnology. (57699.)

179 archeological objects from the lower Mimbres Valley and an earthenware vase from Casas Grandes, Chihuahua, Mexico. Collected by Dr. J. Walter Fewkes, Bureau of American Ethnology. (57777.)

Three stone figurines from the Tewa Indians of New Mexico. Collected by Mrs. M. C. Stevenson, Bureau of American Ethnology. (58129.)

Snipe flute of the Sioux Indians. Received from Rev. A. McG. Beede, of North Dakota. (58254.)

Five archeological objects from Virginia. Gift of Dr. W. B. Barham, of Newsoms, Va.; and a necklace presented by Mrs. J. R. Kello and her daughter, Miss Hattie Kello. (58177.)

PROPERTY.

The most valuable property of the bureau consists of its library (of which brief statistics have been given), a collection of unpublished manuscripts, and several thousand photographic negatives. Comparatively little of this material could be duplicated. The other property of the bureau is described in general terms in the last annual report. The total cost of furniture, typewriters, and other apparatus acquired during the fiscal year was $553.35.

MISCELLANEOUS.

QUARTERS.

The quarters of the bureau have been improved by the completion of the library bookstacks, previously referred to, and the installation of additional electric lights in the library and in one of the office rooms.

PERSONNEL.

The personnel of the bureau has been changed by the appointment of Mr. John P. Harrington, ethnologist, on February 20; the death of Mrs. Matilda Coxe Stevenson, ethnologist, on June 24; the death of Mrs. Ella Slaughter, classified laborer, on November 1, 1914; the transfer of Thomas F. Clark, jr., to the National Museum; the appointment of William Humphrey, stenographer and typewriter; and the appointment of Dennis Sullivan, messenger boy. The correspondence of the bureau and other clerical work has been conducted with the assistance of three clerks and a stenographer and typewriter.

Respectfully submitted.

F. W. Hodge,
Ethnologist-in-Charge.

Dr. Charles D. Walcott,
Secretary of the Smithsonian Institution.

APPENDIX 3.

REPORT ON THE INTERNATIONAL EXCHANGES.

SIR: I have the honor to submit the following report on the operations of the International Exchange Service during the fiscal year ending June 30, 1915:

The system of international exchanges is based on the convention and the resolutions of Congress briefly referred to below:

Convention between the United States and several other countries for the international exchange of official documents and scientific and literary publications, concluded at Brussels in 1886 and proclaimed by the President of the United States in 1889. (Stat., XXV, 1465.) (Since the ratification of this convention, several additional Governments have signified their adherence thereto; while a number of other countries, though they have not officially adhered to the convention, have established international exchange bureaus.)

Resolution providing for the exchange of certain public documents, approved March 2, 1867. (Stat., XIV, 573.) This resolution provides that 50 copies of all documents printed by order of either House of Congress, and also 50 copies of all publications issued by any bureau or department of the Government, shall be placed at the disposal of the Joint Committee on the Library for exchange with foreign countries through the agency of the Smithsonian Institution.

Joint resolution to regulate the distribution of public documents to the Library of Congress for its own use and for international exchange, approved March 2, 1901. (Stat., XXXI, 1464.) By this resolution it is provided that, in lieu of the 50 copies of the publications referred to in the above-mentioned resolution, there shall be placed at the disposal of the Library of Congress for its own use and for international exchange 62 copies of such documents, with the privilege, at the request of the Librarian, of enlarging this number to 100.

Joint resolution for the purpose of more fully carrying into effect the convention concluded at Brussels in 1886 in reference to the immediate exchange of the official journal, approved March 4, 1909. (Stat., XXXV, 1169.) This resolution provides that such number as may be required, not exceeding 100 copies, of the daily issue of e Congressional Record shall be supplied to the Library of Coness for distribution, through the Smithsonian Institution, to the gislative chambers of such foreign Governments as may agree to d to the United States current copies of their parliamentary ord or like publication.

The estimate submitted for the support of the service during 1915 s $32,200, including the allotment for printing and binding, and s amount was granted by Congress. The repayments from private d departmental sources for the transportation of exchanges aggated $4,819.41, making the total available resources for carrying the Exchange Service $37,019.41.

During the year 1915 the total number of packages handled was 5,756, a decrease of 65,911, as compared with the preceding year. e weight of these packages was 367,854 pounds, a decrease of 9,131 pounds. These decreases were caused by the suspension of pments to a number of countries on account of the European war, explained below.

The number and weight of the packages of different classes are licated in the following table:

	Packages.		Weight.	
	Sent.	Received.	Sent.	Received.
			Pounds.	*Pounds.*
ited States parliamentary documents sent abroad	135,050	....	74,126	....
lications received in return for parliamentary documents	....	2,305	....	5,817
ited States departmental documents sent abroad	73,634	....	145,549	....
blications received in return for departmental documents	....	4,976	....	9,389
cellaneous scientific and literary publications sent abroad	39,164	....	80,448	....
cellaneous scientific and literary publications received from broad for distribution in the United States	....	20,627	....	52,525
Total	247,848	27,908	300,123	67,731
Grand total	275,756		367,854	

It should be added that the disparity between the number of packges dispatched and those received in behalf of the Government is not great as indicated by these figures. Packages sent abroad usually ntain only a single publication each, while those received in return ten comprise many volumes. In the case of publications received in change for parliamentary documents and some others the term package" is applied to large boxes containing a hundred or more blications. No lists of these are made in the Exchange Office, as e boxes are forwarded to their destinations unopened. It is also a ct that many returns for publications sent abroad reach their desnations direct by mail and not through the Exchange Service.

Of the 1,653 boxes used in forwarding exchanges to foreign agencies for distribution, 220 contained full sets of United States official documents for authorized depositories and 1,433 were filled with departmental and other publications for depositories of partial sets and for miscellaneous correspondents. The total number of boxes sent abroad during 1915 was 812 less than the preceding year. This decrease was due to the suspended shipments to certain countries owing to the inability of the Institution to secure transportation facilities for forwarding consignments to the various exchange agencies, which condition has been brought about by the European war.

Owing to the disturbed conditions which existed in Europe and the interruption to transportation facilities, shipments to all European countries were suspended during August and a part of September, 1914. On September 17 transmissions were resumed to Great Britain, and during the month of October to Denmark, Holland, Italy, Norway, Portugal, Spain, and Sweden. Through the courtesy of the minister of the Netherlands at Washington, arrangements were made to send consignments to Switzerland by way of Rotterdam, and transmissions to that country were resumed on November 2. On December 8 shipments were resumed to Greece, and on January 23 to France. At the close of the fiscal year, therefore, the only countries to which shipments were not being made were Austria, Belgium, Bulgaria, Germany, Hungary, Montenegro, Roumania, Russia, Serbia, and Turkey. Steps are being taken through the Department of State to send exchanges for Germany to the American consul general at Rotterdam for reforwarding to the German exchange agency in Berlin, and it is hoped that the exchange of publications with Germany will be resumed at an early date. Through the assistance of the Department of State, arrangements have also been made for the forwarding of exchange consignments from Germany to the United States through the American consul general at Rotterdam.

The Russian Commission of International Exchanges was approached with a view to sending exchange consignments to Petrograd by way of Archangel during the summer months, but the commission replied that, as the route in question presents so many difficulties and is so encumbered, it would prefer not to make use of it, and not to renew the sendings until after the conclusion of peace and the reestablishment of the regular communications.

The number of boxes sent to each foreign country and the dates of transmission are shown in the following table:

Consignments of exchanges for foreign countries.

ntry.	Number of boxes.	Date of transmission.
	44	July 16, Sept. 9, Nov. 17, Dec. 17, 1914; Jan. 27, Feb. 26, Apr. 22, May 20, June 22, 1915.
	10	July 8, 1914.[1]
	5	July 11, 1914.[1]
	6	Oct. 8, Dec. 10, 1914; Jan. 28, May 10, June 16, 1915.
	33	July 16, 20, Oct. 19, Nov. 18, 20, Dec. 17, 1914; Jan. 27, Feb. 26, Apr. 22, May 20, June 22, 1915.
NIES	24	July 31, Sept. 17, 25, Oct. 26, Nov. 7, Dec. 5, 1914; Jan. 2, 16, 23, Feb. 6, Mar. 8, 20, Apr. 20, May 1, 29, June 12, 19, 1915.
NA	4	Oct. 31, 1914; Mar. 12, May 7, 1915.
		July 20, Nov. 20, 1914; Jan. 21, Mar. 31, May 29, 1915.
	23	July 16, Oct. 19, Nov. 18, Dec. 17, 1914; Jan. 28, Feb. 26, Apr. 23, May 20, June 22, 1915.
	32	Oct. 28, Nov. 4, 1914; Jan. 2, 30, Mar. 2, Apr. 12, May 13, June 12, 1915.
	15	Oct. 20, Dec. 17, 1914; Jan. 28, Feb. 27, May 15, June 16, 1915.
	12	Oct. 21, Dec. 17, 1914; Jan. 28, Feb. 27, May 5, June 16, 1915.
	5	July 20, Nov. 20, 1914; Jan. 21, Mar. 31, May 29, 1915.
	32	July 24, Oct. 10, Nov. 12, Dec. 14, 1914; Jan. 14, Feb. 20, Mar. 30, May 4, June 4, 1915.
	6	Oct. 31, Dec. 17, 1914; Jan. 28, Feb. 27, May 5, June 16, 1915.
	11	July 24, Nov. 16, 1914; Jan. 12, May 22, June 23, 1915.
	292	July 3, 1914; Jan. 23, Feb. 23, Apr. 30, May 14, 29, June 14, 1915.
	6	July 7, 1914.[1]
N AND IRELAND.	347	July 3, 11, 18, 31, Sept. 17, 25, Oct. 26, Nov. 7, 23, Dec. 5, 12, 19, 26, 1914; Jan. 2, 9, 16, 23, 30, Feb. 6, 13, Mar. 12, 27, Apr. 20, 24, May 1, 8, 15, 22, 29, June 5, 12, 19, 26, 1915.
	11	Oct. 9, Dec. 8, 1914; Mar. 13, May 10, June 22, 1915.
	5	Oct. 31, 1914; Jan. 28, Feb. 27, May 7, June 17, 1915.
	5	July 20, Nov. 20, 1914; Jan. 21, Mar. 31, May 29, 1915.
	5	Oct. 31, 1914; Jan. 28, Feb. 27, May 7, June 17, 1915.
	3	July 8, 1914.[1]
	62	July 3, 16, 31, Sept. 17, 25, Oct. 26, Nov. 7, Dec. 5, 26, 1914; Jan. 16, 30, Feb. 6, 13, Mar. 8, 20, Apr. 10, 24, May 1, 8, 15, 22, 29, June 12, 19, 26, 1915.
	91	July 18, Oct. 7, Nov. 12, Dec. 11, 1914; Jan. 13, Feb. 12, Mar. 11, Apr. 12, May 11, 25, June 11, 25, 1915.
	6	Oct. 8, Dec. 8, 1914; Jan. 28, Mar. 12, May 10, June 22, 1915.
	54	July 15, Nov. 28, Dec. 22, 1914; Jan. 26, Feb. 26, May 4, June 4, 1915.
	5	Jan. 2, Mar. 12, May 12, June 22, 1915.
	4	July 24, Nov. 16, 1914; Mar. 12, May 12, 1915.
ARQUEZ	2	Dec. 10, 1914; Mar. 10, 1915.
	5	July 20, Nov. 20, 1914; Jan. 21, Mar. 31, May 29, 1915.
	5	July 20, Nov. 20, 1914; Jan. 21, Mar. 31, May 29, 1915.
S	38	Oct. 12, Nov. 3, Dec. 9, 1914; Jan. 6, Feb. 10, Mar. 10, Apr. 13, May 18, 27, June 14, 26, 1915.
WALES	26	July 14, Oct. 2, Nov. 14, Dec. 15, 1914; Feb. 24, Apr. 8, May 8, June 8, 1915.
D	26	July 14, Oct. 2, Nov. 14, 1914; Feb. 24, Apr. 9, May 8, June 8, 1915.
	5	Oct. 31, 1914; Jan. 28, Feb. 27, May 7, June 17, 1915.
	23	July 24, Oct. 10, Nov. 12, Dec. 14, 1914; Jan. 14, Feb. 20, Mar. 30, May 4, June 4, 1915.

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[1] Shipments temporarily suspended on account of the European war.

Consignments of exchanges for foreign countries—Continued.

Country.	Number of boxes.	Date of transmission.
Ontario	5	July 20, Nov. 20, 1914; Jan. 21, Mar. 31, May 29, 1915.
Palestine	1	June 30, 1915.
Paraguay	6	Oct. 31, Dec. 4, 1914; Jan. 28, Feb. 27, Mar. 12, May 5, 1915.
Peru	19	July 16, Oct. 20, Nov. 18, Dec. 17, 1914; Feb. 27, Apr. 20, May 20, June 22, 1915.
Portugal	16	July 24, Oct. 9, Nov. 12, Dec. 14, 1914; Feb. 20, Mar. 30, May 4, June 4, 1915.
Quebec	5	July 20, Nov. 20, 1914; Jan. 21, Mar. 31, May 29, 1915.
Queensland	17	July 14, Oct. 2, Nov. 14, Dec. 15, 1914; Feb. 24, Apr. 9, May 8, June 8, 1915.
Russia	9	July 9, 1914.[1]
Salvador	5	Oct. 31, 1914; Jan. 28, Feb. 27, May 7, June 17, 1915.
Siam	4	Dec. 10, 1914; Mar. 12, May 12, June 22, 1915.
South Australia	23	July 14, Oct. 2, Nov. 14, Dec. 15, 1914; Jan. 20, Feb. 24, Apr. 9, May 8, June 8, 1915.
Spain	24	Oct. 9, Nov. 16, 1914; Jan. 12, Feb. 17, May 7, June 7, 1915.
Sweden	59	July 9, Oct. 15, Dec. 1, 1914; Jan. 6, Feb. 10, Mar. 10, 19, Apr. 29, May 26, June 24, 1915.
Switzerland	42	July 11, Nov. 2, Dec. 8, 1914; Feb. 9, Mar. 11, Apr. 28, May 14, 28, 1915.
Syria	2	July 25, Oct. 28, 1914.[1]
Tasmania	14	July 18, 31, Sept. 25, Oct. 26, Nov. 7, Dec. 5, 1914; Jan. 2, 16, Feb. 13, Apr. 20, June 19, 1915.
Trinidad	5	Oct. 8, Dec. 10, 1914; Jan. 25, May 10, June 22, 1915.
Turkey	3	July 25, Oct. 28, 1914.[1]
Union of South Africa	30	July 23, Oct. 30, Dec. 10, 1914; Jan. 12, Feb. 16, Apr. 30, May 27, June 25, 1915.
Uruguay	17	July 16, Oct. 20, Nov. 18, Dec. 17, 1914; Jan. 28, Feb. 27, Apr. 23, May 20, June 22, 1915.
Venezuela	11	Oct. 20, Dec. 17, 1914; Jan. 28, Feb. 29, May 5, June 16, 1915.
Victoria	25	July 14, Oct. 2, Nov. 14, Dec. 15, 1914; Jan. 20, Feb. 24, Apr. 8, May 8, June 8, 1915.
Western Australia	20	July 3, 31, Sept. 17, 25, Oct. 26, Nov. 7, Dec. 5, 12, 1914; Jan. 16, 23, Feb. 6, 13, Mar. 8, 20, Apr. 20, June 12, 1915.
Windward and Leeward Islands.	3	Dec. 10, 1914; Mar. 12, June 22, 1915.

[1] Shipments temporarily suspended on account of the European war.

With the exception of one package for the chief secretary to the government of Madras, India, and one for the undersecretary to the government of the United Provinces, Allahabad, India—each containing 12 United States governmental documents—no consignments have, so far as the Institution has been informed, been lost during the year, which is considered remarkable in view of the number of ships sunk by war vessels.

A number of boxes have been detained at several ports of debarkation owing to the fact that the vessels on which they were forwarded have been interned. Wherever possible the Institution has obtained the release of these consignments and they have been

t forward to their destinations. At the close of the year one box
Sofia, one for Serbia, and two for Syria, all forwarded from New
rk July 2, 1914, per steamship *Barbarossa*, were held at Bremen,
many, and four boxes for Pretoria, forwarded from New York
y 10, 1914, per steamship *Rauenfels*, were held at Bahia, Brazil.
th the exception of the latter, these consignments will probably
held until the close of the war. The Institution is endeavoring
have the boxes for the Government Printing Works at Pretoria
ased and forwarded from Bahia to destination.

uring the year the Institution has obtained for the Library of
ngress from the Chinese Government, in exchange for the full
ies of United States official documents sent to China, a set of the
perial Institutes of the Ching Dynasty and of the Imperial Rec-
ls Relative to the Suppression of Rebellions. These valuable
rks comprise a total of 684 volumes. Many other foreign govern-
ntal documents have been obtained through the Exchange Service
the Library of Congress. In special instances, when requested
do so, the Institution has used the facilities of the Exchange
rvice to procure publications for both foreign and domestic gov-
mental and scientific establishments. Quite a number of requests
foreign organizations for publications have been received from
nerican consular officers through the Department of State.

wing largely to the efforts of Mr. Vittorio Benedetti, recently ap-
inted chief of the Italian office of International Exchanges, the
vice between Italy and the United States has been very much
proved during the year. Mr. Benedetti has presented the Insti-
ion with a typewritten copy of an account prepared by him of
origin and development of the International Exchange Service.
translation will be made of this interesting document and placed
the archives of the exchanges for reference.

he act making appropriations for sundry civil expenses of the
vernment for the fiscal year ending June 30, 1916, included a pro-
ion authorizing the Government branches under the direction of
Smithsonian Institution to exchange typewriters, adding ma-
nes, and other labor-saving devices in part payment for like ar-
es. This office exchanged four typewriting machines during the
r.

he multigraph duplicating machine supplied by the Institution,
ich has been in use in the Exchange Office since 1908, has been
laced by a new machine. This multigraph, with stand, cost
3.50, and was purchased from the appropriation for the Inter-
ional Exchanges. It has been found to be very useful in the
nting not only of circular letters, but of envelopes, labels, and
er forms.

The walls, ceilings, floors, and woodwork of the government and shipping rooms were painted during the year and the government room was provided with a large sorting table 27 feet 3 inches long, 2 feet 10½ inches wide, and 3 feet high, with drop leaf at end and two drawers and shelves. There are only two windows in the government room, and on account of the thickness of the walls of the Smithsonian Building these admitted very little light. The windows in that room have therefore been splayed, with the result that the lighting has been greatly improved.

Another room has been assigned by the Institution for the use of the Exchange Office, which has facilitated the handling of the many packages received for transmission through the service.

The unsatisfactory electric lighting system throughout the Exchange Office has been very much improved by the installation of a semi-indirect lighting system. The washroom provided for the use of the employees has been fitted up with two lavatories.

FOREIGN DEPOSITORIES OF UNITED STATES GOVERNMENTAL DOCUMENTS.

In accordance with treaty stipulations and under the authority of the congressional resolutions of March 2, 1867, and March 2, 1901, setting apart a certain number of documents for exchange with foreign countries, there are now sent regularly to depositories abroad 56 full sets of United States official publications and 36 partial sets.

The partial set of publications sent to Ceylon has in the past been forwarded in care of the American consul at Colombo. The consul now informs the Institution that the documents in question are deposited in the Record Department of the Library of the Colonial Secretary's Office, and consignments will therefore be sent direct to that office in the future.

The recipients of full and partial sets are as follows:

DEPOSITORIES OF FULL SETS.

ARGENTINA: Ministerio de Relaciones Exteriores, Buenos Aires.

AUSTRALIA: Library of the Commonwealth Parliament, Melbourne.

AUSTRIA: K. K. Statistische Zentral-Kommission, Vienna.

BADEN: Universitäts-Bibliothek, Freiburg. (Depository of the Grand Duchy of Baden.)

BAVARIA: Königliche Hof- und Staats-Bibliothek, Munich.

BELGIUM: Bibliothèque Royale, Brussels.

BOMBAY: Secretary to the Government, Bombay.

BRAZIL: Bibliotheca Nacional, Rio de Janeiro.

BUENOS AIRES: Biblioteca de la Universidad Nacional de La Plata. (Depository of the Province of Buenos Aires.)

Library of Parliament, Ottawa.
Biblioteca del Congreso Nacional, Santiago.
American-Chinese Publication Exchange Department, Shanghai Bureau
eign Affairs, Shanghai.
A: Biblioteca Nacional, Bogotá
ICA: Oficina de Depósito y Canje Internacional de Publicaciones, San

Secretaria de Estado (Asuntos Generales y Canje Internacional),
a.
K: Kongelige Bibliotheket, Copenhagen.
: British Museum, London.
Bibliothèque Nationale, Paris.
Y: Deutsche Reichstags-Bibliothek, Berlin.
: City Librarian, Mitchell Library, Glasgow.
Bibliothèque Nationale, Athens.
Secrétairerie d'État des Relations Extérieures, Port au Prince.
Y: Hungarian House of Delegates, Budapest.
Department of Education (Books), Government of India, Calcutta.
: National Library of Ireland, Dublin.
Biblioteca Nazionale Vittorio Emanuele, Rome.
Imperial Library of Japan, Tokyo.
London School of Economics and Political Science. (Depository of the
n County Council.)
A: Provincial Library, Winnipeg.
Instituto Bibliográfico, Biblioteca Nacional, Mexico.
ANDS: Library of the States General, The Hague.
TH WALES: Public Library of New South Wales, Sydney.
LAND: General Assembly Library, Wellington.
: Storthingets Bibliothek, Christiania.
: Legislative Library, Toronto.
Préfecture de la Seine.
iblioteca Nacional, Lima.
L: Bibliotheca Nacional, Lisbon.
: Königliche Bibliothek, Berlin.
Library of the Legislature of the Province of Quebec, Quebec.
AND: Parliamentary Library, Brisbane.
Imperial Public Library, Petrograd.
: Königliche Oeffentliche Bibliothek, Dresden.
Section Administrative du Ministère des Affaires Étrangères, Belgrade.
USTRALIA: Parliament Library, Adelaide.
Servicio del Cambio Internacional de Publicaciones, Cuerpo Facultativo
chiveros, Bibliotecarios y Arqueólogos, Madrid.
: Kungliga Biblioteket, Stockholm.
LAND: Bibliothèque Fédérale, Berne.
IA: Parliamentary Library, Hobart.
: Department of Public Instruction, Constantinople.
F SOUTH AFRICA: State Library, Pretoria, Transvaal.
Y: Oficina de Canje Internacional de Publicaciones, Montevideo.
LA: Biblioteca Nacional, Caracas.
: Public Library, Melbourne.
AUSTRALIA: Public Library of Western Australia, Perth.
MBERG: Königliche Landesbibliothek, Stuttgart.

DEPOSITORIES OF PARTIAL SETS.

Alberta: Provincial Library, Edmonton.
Alsace-Lorraine: K. Ministerium für Elsass-Lothringen, Strassburg.
Bolivia: Ministerio de Colonización y Agricultura, La Paz.
Bremen: Senatskommission für Reichs- und Auswärtige Angelegenheiten.
British Columbia: Legislative Library, Victoria.
British Guiana: Government Secretary's Office, Georgetown, Demerara.
Bulgaria: Minister of Foreign Affairs, Sofia.
Ceylon: Colonial Secretary's Office (Record Department of the Library), Colombo.
Ecuador: Biblioteca Nacional, Quito.
Egypt: Bibliothèque Khédiviale, Cairo.
Finland: Chancery of Governor, Helsingfors.
Guatemala: Secretary of the Government, Guatemala.
Hamburg: Senatskommission für die Reichs- und Auswärtigen Angelegenheiten.
Hesse: Grossherzogliche Hof Bibliothek, Darmstadt.
Honduras: Secretary of the Government, Tegucigalpa.
Jamaica: Colonial Secretary, Kingston.
Liberia: Department of State, Monrovia.
Lourenço Marquez: Government Library, Lourenço Marquez.
Lübeck: President of the Senate.
Madras, Province of: Chief Secretary to the Government of Madras, Public Department, Madras.
Malta: Lieutenant Governor, Valetta.
Montenegro: Ministère des Affaires Étrangères, Cetinje.
New Brunswick: Legislative Library, Fredericton.
Newfoundland: Colonial Secretary, St. John's.
Nicaragua: Superintendente de Archivos Nacionales, Managua.
Northwest Territories: Government Library, Regina.
Nova Scotia: Provincial Secretary of Nova Scotia, Halifax.
Panama: Secretaria de Relaciones Exteriores, Panama.
Paraguay: Oficina General de Inmigracion, Asuncion.
Prince Edward Island: Legislative Library, Charlottetown.
Roumania: Academia Romana, Bucharest.
Salvador: Ministerio de Relaciones Exteriores, San Salvador.
Siam: Department of Foreign Affairs, Bangkok.
Straits Settlements: Colonial Secretary, Singapore.
United Provinces of Agra and Oudh: Under Secretary to Government, Allahabad.
Vienna: Bürgermeister der Haupt- und Residenz-Stadt.

INTERPARLIAMENTARY EXCHANGE OF OFFICIAL JOURNALS.

There are now 33 countries with which the immediate exchange of official journals with the United States is carried on, the Government of Costa Rica having been added during the year. A complete list of the Governments to which the Congressional Record is now sent is given below:

Argentine Republic.
Australia.
Austria.
Baden.
Belgium.
Brazil.
Buenos Aires, Province of.
Canada.

a Rica.
a.
mark.
nce.
at Britain.
ece.
temala.
nduras.
ngary.
ly.
eria.
w South Wales.
w Zealand.

Portugal.
Prussia.
Queensland.
Roumania.
Russia.
Serbia.
Spain.
Switzerland.
Transvaal.
Union of South Africa.
Uruguay.
Western Australia.

ST OF BUREAUS OR AGENCIES THROUGH WHICH EXCHANGES ARE TRANSMITTED.

The following is a list of the bureaus or agencies through which exchanges transmitted:

GERIA, *via* France.

GOLA, *via* Portugal.

GENTINA: Comisión Protectora de Bibliotecas Populares, Reconquista 538, Buenos Aires.

STRIA: K. K. Statistische Zentral-Kommission, Vienna.

ORES, *via* Portugal.

LGIUM: Service Belge des Échanges Internationaux, Rue des Longs-Chariots 6, Brussels.

LIVIA: Oficina Nacional de Estadística, La Paz.

AZIL: Serviço de Permutações Internacionaes, Bibliotheca Nacional, Rio de aneiro.

TISH COLONIES: Crown Agents for the Colonies, London.

TISH GUIANA: Royal Agricultural and Commercial Society, Georgetown.

TISH HONDURAS: Colonial Secretary, Belize.

LGARIA: Institutions Scientifiques de S. M. le Roi de Bulgarie, Sofia.

NARY ISLANDS, *via* Spain.

ILE: Servicio de Canjes Internacionales, Biblioteca Nacional, Santiago.

INA: American-Chinese Publication Exchange Department, Shanghai Bueau of Foreign Affairs, Shanghai.

OMBIA: Oficina de Canjes Internacionales y Reparto, Biblioteca Nacional, Bogotá.

STA RICA: Oficina de Depósito y Canje Internacional de Publicaciones, San osé.

NMARK: Kongelige Danske Videnskabernes Selskab, Copenhagen.

TCH GUIANA: Surinaamsche Koloniale Bibliotheek, Paramaribo.

UADOR: Ministerio de Relaciones Exteriores, Quito.

YPT: Government Publications Office, Printing Department, Cairo.

ANCE: Service Français des Échanges Internationaux, 110 Rue de Grenelle, Paris.

RMANY: Amerika-Institut, Berlin, N. W. 7.

EAT BRITAIN AND IRELAND: Messrs. William Wesley & Son, 28 Essex Street, Strand, London.

EECE: Bibliothèque Nationale, Athens.

EENLAND, *via* Denmark.

ADELOUPE, *via* France.

ATEMALA: Instituto Nacional de Varones, Guatemala.

Guinea, *via* Portugal.

Haiti: Secrétaire d'État des Relations Extérieures, Port au Prince.

Honduras: Biblioteca Nacional, Tegucigalpa.

Hungary: Dr. Julius Pikler, Municipal Office of Statistics, Váci-utca 80, Budapest.

Iceland, *via* Denmark.

India: India Store Department, India Office, London.

Italy: Ufficio degli Scambi Internazionali, Biblioteca Nazionale Vittorio Emanuele, Rome.

Jamaica: Institute of Jamaica, Kingston.

Japan: Imperial Library of Japan, Tokyo.

Java, *via* Netherlands.

Korea: His Imperial Japanese Majesty's Residency-General, Seoul.

Liberia: Bureau of Exchanges, Department of State, Monrovia.

Lourenço Marquez: Government Library, Lourenço Marquez.

Luxemburg, *via* Germany.

Madagascar, *via* France.

Madeira, *via* Portugal.

Montenegro: Ministère des Affaires Étrangères, Cetinje.

Mozambique, *via* Portugal.

Netherlands: Bureau Scientifique Central Néerlandais, Bibliothèque de l'Université, Leyden.

New Guinea, *via* Netherlands.

New South Wales: Public Library of New South Wales, Sydney.

New Zealand: Dominion Museum, Wellington.

Nicaragua: Ministerio de Relaciones Exteriores, Managua.

Norway: Kongelige Norske Frederiks Universitet Bibliotheket, Christiania.

Panama: Secretaria de Relaciones Exteriores, Panama.

Paraguay: Servicio de Canje Internacional de Publicaciones, Sección Consular y de Comercio, Ministerio de Relaciones Exteriores, Asuncion.

Persia: Board of Foreign Missions of the Presbyterian Church, New York City.

Peru: Oficina de Reparto, Depósito y Canje Internacional de Publicaciones, Ministerio de Fomento, Lima.

Portugal: Serviço de Permutações Internacionaes, Inspecção Geral das Bibliothecas e Archivos Publicos, Lisbon.

Queensland: Bureau of Exchanges of International Publications, Chief Secretary's Office, Brisbane.

Roumania: Academia Romana, Bucharest.

Russia: Commission Russe des Échanges Internationaux, Bibliothèque Imperiale Publique, Petrograd.

Salvador: Ministerio de Relaciones Exteriores, San Salvador.

Serbia: Section Administrative du Ministère des Affaires Étrangères, Belgrade.

Siam: Department of Foreign Affairs, Bangkok.

South Australia: Public Library of South Australia, Adelaide.

Spain: Servicio del Cambio Internacional de Publicaciones, Cuerpo Facultativo de Archiveros, Bibliotecarios y Arqueólogos, Madrid.

Sumatra, *via* Netherlands.

Sweden: Kongliga Svenska Vetenskaps Akademien, Stockholm.

Switzerland: Service des Échanges Internationaux Bibliothèque Fédéral Centrale, Berne.

Syria: Board of Foreign Missions of the Presbyterian Church, New York.

Tasmania: Secretary to the Premier, Hobart.

Trinidad: Royal Victoria Institute of Trinidad and Tobago, Port-of-Spain.

TUNIS, *via* France.
TURKEY: American Board of Commissioners for Foreign Missions, Boston.
UNION OF SOUTH AFRICA: Government Printing Works, Pretoria, Transvaal.
URUGUAY: Oficina de Canje Internacional, Montevideo.
VENEZUELA: Biblioteca Nacional, Caracas.
VICTORIA: Public Library of Victoria, Melbourne.
WESTERN AUSTRALIA: Public Library of Western Australia, Perth.
WINDWARD AND LEEWARD ISLANDS: Imperial Department of Agriculture, Bridgetown, Barbados.

Respectfully submitted.

C. W. SHOEMAKER,
Chief Clerk International Exchange Service.

DR. CHARLES D. WALCOTT,
Secretary of the Smithsonian Institution.

AUGUST 24, 1915.

APPENDIX 4.

REPORT ON THE NATIONAL ZOOLOGICAL PARK.

SIR: I have the honor to submit herewith a report concerning th operations of the National Zoological Park during the fiscal yea ending June 30, 1915.

The sundry civil act approved August 1, 1914, provided $100,00 for improvement and maintenance. The cost of food for the animal during the year was about $23,000, being slightly less than th previous year, when it attained the highest figure yet reached; extensive repairs were required on roads and a considerable amount ha to be expended on some of the buildings, all of which reduced th amount available for additional improvements.

ACCESSIONS.

Eighty-eight animals were born and hatched in the park. Amon these were a South American tapir, an Arabian camel, 4 otters, bears, a beaver, and various other mammals and birds.

The accessions included altogether 25 species not hitherto repr sented in the collection, and although considerably greater in numb than during the previous year, included few of importance, as tl supply of foreign animals was largely cut off by the war. A spec men of Przewalski's horse was secured as were various other anima of less note; a considerable number of waterfowl were also added.

EXCHANGES.

Eighty-two animals were secured through exchange, including pumas, a jaguar, a palm civet and other mammals, a considerabl number of birds, and a few reptiles.

GIFTS.

Mr. H. H. Bailey, Newport News, Va., a whistling swan.
Mr. H. B. Barber, Washington, D. C., a great horned owl.
Mr. D. L. Barton, Washington, D. C., an alligator.
Mrs. O. L. Beardsley, Washington, D. C., three spermophiles.
Mrs. B. O. Billingsby, Jules Station, Va., a skunk.
Miss Lillian Birney, Washington, D. C., an alligator.
Mr. F. D. Bradford, Washington, D. C., four alligators.
Mr. M. E. Bruce, Philadelphia, Pa., two yellow-naped parrots.

Mr. John Buckey, Washington, D. C., an alligator.
Mr. Joseph H. Curtis, Washington, D. C., a woodchuck.
Mrs. J. B. Dodson, Washington, D. C., an opossum.
Mr. G. A. Durfee, Washington, D. C., a grass parrakeet.
Mr. C. C. Estes, Washington, D. C., two cottontail rabbits.
Mrs. Sheldon Evans, Washington, D. C., a white-fronted parrot.
Mr. E. Fabre, Washington, D. C., a red-shouldered hawk.
Mrs. George Fowler, Philadelphia, Pa., a white-throated capuchin.
Mr. F. A. Frazer, Spotsylvania, Va., a Cooper's hawk.
Mr. James Frazier, Washington, D. C., a silver pheasant.
Brother Geraptin, Franciscan Monastery, Washington, D. C., two mocking
ds.
Mr. C. G. Hoffman, Remington, Va., a barn owl.
Mr. J. M. Johnson, Washington, D. C., a bald eagle.
Mrs. D. C. Laws, Port Limon, Costa Rica, a white-throated capuchin.
Mrs. Arthur Lee, Washington, D. C., a silver-blue tanager.
Mr. Oscar M. Link, Washington, D. C., a sparrow hawk.
Mr. E. A. McIlhenny, Avery Island, La., six blue-winged teal.
Mr. Vinson W. McLean, Washington, D. C., a diamond rattlesnake.
Mr. Lester Martin, Washington, D. C., a raccoon.
Mr. Fred. Mertens, Washington, D. C., a bald eagle.
Mr. A. M. Nicholson, Orlando, Fla., a diamond rattlesnake.
Mr. John M. Pickrell, Washington, D. C., a diamond rattlesnake.
Mr. Edw. S. Schmid, Washington, D. C., a screech owl, two barn owls, and a
eading adder.
Mr. Fred. Schnaebele, Washington, D. C., an alligator.
Dr. R. W. Shufeldt, Washington, D. C., a black snake and a barred owl.
Mrs. C. B. Strong, Washington, D. C., a merganser.
Mrs. Swyhart, Washington, D. C., a horned lizard.
Mr. E. Thomas, Washington, D. C., an alligator.
Mr. Samuel G. Walker, Weld, W. Va., a bay lynx.
Mr. William Whyte, Washington, D. C., an alligator.
Hon. Woodrow Wilson, Washington, D. C., an opossum.
Mr. D. E. Winstead, Washington, D. C., an alligator.
Mr. N. P. Wood, North Mountain, W. Va., a green snake.
Unknown donor, a red fox.
Unknown donor, a Gila monster.

LOSSES.

The most noteworthy loss during the year was the death by rup-
e of the aorta of the largest of the Alaskan brown bears, caught
a small cub in May, 1901. He had attained a weight of 1,160
unds. A Coke's hartbeest and several monkeys died from tuber-
osis, two pronghorn antelopes from necrotic stomatitis, a lion
m pericarditis, and a large bison bull (the "ten-dollar buffalo")
m the effects of old age. Quail disease was again brought into
collection in a shipment of birds received from the southwestern
ited States and caused the death of more than half of the quail in
collection. A few waterfowl, also, died from aspergillosis, and
re was some loss of birds from attacks by predatory animals

roaming at large in the park, though it was less than during the previous year. Forty-one of the animals that died were transferred to the National Museum. Autopsies were made, as usual, by the Pathological Division of the Bureau of Animal Industry, Department of Agriculture.[1]

ANIMALS IN THE COLLECTION JUNE 30, 1915.

MAMMALS.

Green monkey (*Cercopithecus callitrichus*)	1
Mona monkey (*Cecropithecus mona*)	3
Diana monkey (*Cercopithecus diana*)	1
Bonnet monkey (*Macacus sinicus*)	1
Macaque monkey (*Macacus cynomolgus*)	2
Pig-tailed monkey (*Macacus nemestrinus*)	3
Rhesus monkey (*Macacus rhesus*)	31
Brown macaque (*Macacus arctoides*)	2
Japanese monkey (*Macacus fuscatus*)	8
Moor macaque (*Macacus maurus*)	1
Chacma (*Papio porcarius*)	1
Hamadryas baboon (*Papio hamadryas*)	2
Mandrill (*Papio maimon*)	1
White-throated capuchin (*Cebus hypoleucus*)	4
Brown monkey (*Cebus fatuellus*)	8
Mongoose lemur (*Lemur mongoz*)	2
Ring-tailed lemur (*Lemur catta*)	1
Polar bear (*Thalarctos maritimus*)	2
European brown bear (*Ursus arctos*)	2
Kadiak bear (*Ursus middendorffi*)	1
Yakutat bear (*Ursus dalli*)	1
Alaskan brown bear (*Ursus gyas*)	2
Kidder's bear (*Ursus kidderi*)	2
Hybrid bear (*Ursus kidderi-arctos*)	2
Himalayan bear (*Ursus thibetanus*)	1
Japanese bear (*Ursus japonicus*)	1
Grizzly bear (*Ursus horribilis*)	3
Black bear (*Ursus americanus*)	9
Cinnamon bear (*Ursus americanus*)	2
Sloth bear (*Melursus ursinus*)	1
Kinkajou (*Cercoleptes caudivolvulus*)	1
Cacomistle (*Bassariscus astuta*)	1
Gray coatimundi (*Nasua narica*)	4
Raccoon (*Procyon lotor*)	11
American badger (*Taxidea taxus*)	8
European badger (*Meles taxus*)	2
Common skunk (*Mephitis putida*)	3
Tayra (*Galictis barbara*)	1
American marten (*Mustela americana*)	4
Fisher (*Mustela pennantii*)	1
Mink (*Putorius vison*)	16
Common ferret (*Putorius putorius*)	1
Black-footed ferret (*Putorius nigripes*)	1
North American otter (*Lutra canadensis*)	5
Eskimo dog (*Canis familiaris*)	14
Dingo (*Canis dingo*)	1
Gray wolf (*Canis occidentalis*)	4
Coyote (*Canis latrans*)	2
Woodhouse's coyote (*Canis frustror*)	3
Red fox (*Vulpes pennsylvanicus*)	5
Swift fox (*Vulpes velox*)	1
Arctic fox (*Vulpes lagopus*)	1
Gray fox (*Urocyon cinereo-argenteus*)	4
Spotted hyena (*Hyæna crocuta*)	1
Indian palm civet (*Viverra civettina*)	1
Common genet (*Genetta genetta*)	2
Cheetah (*Cynailurus jubatus*)	2
Sudan lion (*Felis leo*)	3
Kilimanjaro lion (*Felis leo sabakiensis*)	1
Tiger (*Felis tigris*)	2
Puma (*Felis oregonensis hippolestes*)	4
Jaguar (*Felis onca*)	1
Leopard (*Felis pardus*)	3
Black leopard (*Felis pardus*)	1
Canada lynx (*Lynx canadensis*)	1
Bay lynx (*Lynx rufus*)	8
Spotted lynx (*Lynx rufus texensis*)	2
California lynx (*Lynx rufus californicus*)	1
Steller's sea lion (*Eumetopias stelleri*)	1
California sea lion (*Zalophus californianus*)	2
Northern fur seal (*Callotaria alascana*)	1
Harbor seal (*Phoca vitulina*)	1
Fox squirrel (*Sciurus niger*)	9
Western fox squirrel (*Sciurus ludovicianus*)	8
Gray squirrel (*Sciurus carolinensis*)	40
Black squirrel (*Sciurus carolinensis*)	20
Albino squirrel (*Sciurus carolinensis*)	1
Thirteen-lined spermophile (*Spermophilus tridecimlineatous*)	2
Prairie dog (*Cyomys ludovicianus*)	60
Woodchuck (*Marmota monax*)	2
Alpine marmot (*Marmota marmotta*)	1

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[1] The causes of death were reported to be as follows: Enteritis, 20; gastritis, 2; gastroenteritis, 1; quail disease, 20; pneumonia, 8; tuberculosis, 10; congestion of lungs, 4; pleurisy, 1; aspergillosis, 4; congestion of liver, 5; rupture of liver, 1; nephritis, 1; peritonitis, 1; septicemia, 2; pyemia, 1; septic endometritis. 1; pericarditis, 3; rupture of aorta, 1; hemorrhage on spinal cord, 1; visceral gout, 2; chronic arthritis, 1; impaction of intestine, 1; necrotic stomatitis, 2; anemia, 8; wound infection, 1; accident, 2; undetermined, 7.

eaver (*Castor canadensis*)	5
castor coypus*)	2
rcupine (*Hystrix cristata*)	4
upine (*Hystrix leucura*)	1
upine (*Erethizon dorsatus*)	1
rcupine (*Erethizon dorsa-* no	1
agostomus trichodactylus*)	1
uti (*Dasyprocta mexicana*)	1
uti (*Dasyprocta azaræ*)	1
uti (*Dasyprocta cristata*)	2
ed agouti (*Dasyprocta* *pha*)	2
genys paca)	2
(*Cavia cutleri*)	13
cavy (*Dolichotis pata-*	2
Hydrochærus capybara)	1
bbit (*Lepus cuniculus*)	15
phant (*Elephas oxyotis*)	2
hant (*Elephas maximus*)	1
pir (*Tapirus americanus*)	4
(*Equus przewalskii*)	1
ra (*Equus grevyi*)	2
hybrid (*Equus grevyi-ca-*	1
y hybrid (*Equus grevyi-asi-*	1
ra (*Equus burchelli granti*)	1
ccary (*Dicotyles angulatus*)	3
Sus scrofa)	1
art hog (*Phacochærus afri-*	2
us (*Hippopotamus amphi-*	2
Lama huanachus)	2
ma glama)	7
ma pacos)	8
ama vicugna)	1
mel (*Camelus bactrianus*)	2
nel (*Camelus dromedarius*)	4

Sambar deer (*Cervus unicolor*)	3
Philippine deer (*Cervus philippinus*)	1
Hog deer (*Cervus porcinus*)	9
Barasingha deer (*Cervus duvaucelii*)	15
Axis deer (*Cervus axis*)	8
Japanese deer (*Cervus sika*)	12
Red deer (*Cervus elaphus*)	8
American elk (*Cervus canadensis*)	10
Fallow deer (*Cervus dama*)	5
Virginia deer (*Odocoileus virginianus*)	15
Mule deer (*Odocoileus hemionus*)	1
Columbian black-tailed deer (*Odocoileus columbianus*)	1
Cuban deer (*Odocoileus sp.*)	1
Blessbok (*Damaliscus albifrons*)	1
White-tailed gnu (*Connochætes gnu*)	1
Defassa water buck (*Cobus defassa*)	1
Indian antelope (*Antilope cervicapra*)	4
Arabian gazelle (*Gazella arabica*)	2
Sable antelope (*Hippotragus niger*)	1
Nilgai (*Boselaphus tragocamelus*)	3
Congo harnessed antelope (*Tragelaphus gratus*)	2
Tahr (*Hemitragus jemlaicus*)	4
Common goat (*Capra hircus*)	2
Angora goat (*Capra hircus*)	1
Circassian goat (*Capra hircus*)	5
Barbary sheep (*Ovis tragelaphus*)	13
Barbados sheep (*Ovis aries-tragelaphus*)	8
Anoa (*Anoa depressicornis*)	1
Zebu (*Bibos indicus*)	3
Yak (*Poëphagus grunniens*)	5
American bison (*Bison americanus*)	17
Hairy armadillo (*Dasypus villosus*)	3
Wallaroo (*Macropus robustus*)	4
Red kangaroo (*Macropus rufus*)	1
Bennett's wallaby (*Macropus ruficollis bennetti*)	1
Virginia opossum (*Didelphys marsupialis*)	2

BIRDS.

rd (*Mimus polyglottos*)	2
umetella carolinensis)	1
bin (*Liothrix luteus*)	2
thrush (*Garrulax leucolo-*	2
gray jumper (*Struthidea*	4
h (*Tanagra episcopus*)	4
finch (*Amadina fasciata*)	8
(*Amadina castanotis*)	4
d finch (*Munia atricapilla*)	5
ed finch (*Munia malacca*)	6
ed finch (*Munia maja*)	9
ch (*Munia punctularia*)	6
w (*Munia oryzivora*)	13
a sparrow (*Munia oryzi-*	12
d grass finch (*Poëphila acu-*	1
inch (*Aidemosyne cantans*)	2
easted finch (*Donacola cas-* *rae*)	6

Napolean weaver (*Pyromelana afra*)	4
Madagascar weaver (*Foudia madagascariensis*)	4
Red-billed weaver (*Quelea quelea*)	8
Paradise weaver (*Vidua paradisea*)	7
Red-crested cardinal (*Paroaria cucullata*)	2
Common cardinal (*Cardinalis cardinalis*)	2
Siskin (*Spinus spinus*)	5
Saffron finch (*Sycalis flaveola*)	13
Yellow hammer (*Emberiza citrinella*)	1
Common canary (*Serinus canarius*)	5
Linnet (*Linota cannabina*)	4
Cowbird (*Molothrus ater*)	1
Glossy starling (*Lamprotornis caudatus*)	1
Malabar mynah (*Poliopsar malabaricus*)	2
European raven (*Corvus corax*)	1
American raven (*Corvus corax sinuatus*)	1

Rocky Mountain jay (*Perisoreus canadensis capitalis*)	8
White-throated jay (*Garrulus leucotis*)	1
Blue jay (*Cyanocitta cristata*)	8
American magpie (*Pica pica hudsonica*)	8
Red-billed magpie (*Urocissa occipitalis*)	1
Yellow tyrant (*Pitangus sulphuratus rufipennis*)	1
Giant kingfisher (*Dacelo gigas*)	2
Concave-casqued hornbill (*Dichoceros bicornis*)	1
Reddish motmot (*Momotus subrufescens*)	1
Sulphur-crested cockatoo (*Cacatua galerita*)	8
White cockatoo (*Cacatua alba*)	5
Leadbeater's cockatoo (*Cacatua leadbeateri*)	2
Bare-eyed cockatoo (*Cacatua gymnopis*)	8
Roseate cockatoo (*Cacatua roseicapilla*)	18
Yellow and blue macaw (*Ara ararauna*)	2
Red and yellow and blue macaw (*Ara macao*)	7
Red and blue macaw (*Ara chloroptera*)	2
Great green macaw (*Ara militaris*)	1
Cuban parrot (*Amazona leucocephala*)	1
Orange-winged amazon (*Amazona amazonica*)	1
Festive amazon (*Amazona festiva*)	1
Porto Rican amazon (*Amazona vittata*)	1
Yellow-shouldered amazon (*Amazona ochroptera*)	2
Yellow-fronted amazon (*Amazona ochrocephala*)	2
Yellow-naped amazon (*Amazona auripalliata*)	2
Yellow-headed amazon (*Amazona levaillanti*)	2
Blue-fronted amazon (*Amazona æstiva*)	2
Lesser vasa parrot (*Coracopsis nigra*)	1
Banded parrakeet (*Palæornis fasciata*)	2
Love bird (*Agapornis pullaria*)	1
Shell parrakeet (*Melopsittacus undulatus*)	4
Great horned owl (*Bubo virginianus*)	10
Arctic horned owl (*Bubo virginianus subarcticus*)	1
Barred owl (*Strix varia*)	4
Sparrow hawk (*Falco sparverius*)	8
Bald eagle (*Haliæetus leucocephalus*)	12
Alaskan bald eagle (*Haliæetus leucocephalus alascanus*)	1
Golden eagle (*Aquila chrysaëtos*)	2
Harpy eagle (*Thrasaëtus harpyia*)	1
Crowned hawk eagle (*Spizaëtus coronatus*)	1
Rough-legged hawk (*Archibuteo lagopus sancti-johannis*)	1
Cooper's hawk (*Accipiter cooperi*)	1
Venezuelan hawk	1
Caracara (*Polyborus cheriway*)	8

Lammergeyer (*Gypaëtus barbatus*)	1
South American condor (*Sarcorhamphus gryphus*)	1
California condor (*Gymnogyps californianus*)	3
Griffon vulture (*Gyps fulvus*)	2
Cinereous vulture (*Vultur monachus*)	2
Egyptian vulture (*Neophron percnopterus*)	1
Turkey vulture (*Cathartes aura*)	4
Black vulture (*Catharista urubu*)	2
King vulture (*Gypagus papa*)	2
Snow pigeon (*Columba leuconota*)	2
Red-billed pigeon (*Columba flavirostris*)	4
White-crowned pigeon (*Columba leucocephala*)	2
Band-tailed pigeon (*Columba fasciata*)	4
Mourning dove (*Zenaidura macroura*)	7
Peaceful dove (*Geopelia tranquilla*)	2
Zebra dove (*Geopelia striata*)	12
Collared turtle dove (*Turtur risorius*)	17
Cape masked dove (*Œna capensis*)	4
Australian crested pigeon (*Ocyphaps lophotes*)	6
Wonga-wonga pigeon (*Leucosarcia picata*)	4
Nicobar pigeon (*Calænas nicobarica*)	2
Red-billed curassow (*Crax carunculata*)	1
Wild turkey (*Meleagris gallopavo silvestris*)	5
Peafowl (*Pavo cristata*)	60
Peacock pheasant (*Polyplectron chinquis*)	1
Silver pheasant (*Euplocamus nycthemerus*)	1
European quail (*Coturnix communis*)	1
Bobwhite (*Colinus virginianus*)	3
Curaçoa crested quail (*Eupsychortyx cristatus*)	4
Scaled quail (*Callipepla squamata*)	1
Valley quail (*Lophortyx californica vallicola*)	3
Gambel's quail (*Lophortyx gambeli*)	1
Massena quail (*Cyrtonyx montezumæ*)	1
American coot (*Fulica americana*)	5
Great bustard (*Otis tarda*)	1
Common cariama (*Cariama cristata*)	1
Demoiselle crane (*Anthropoides virgo*)	7
Crowned crane (*Balearica pavonina*)	3
Whooping crane (*Grus americana*)	1
Sand-hill crane (*Grus mexicana*)	6
Australian crane (*Grus australasiana*)	1
European crane (*Grus cinerea*)	1
Indian white crane (*Grus leucogeranus*)	1
Ruff (*Machetes pugnax*)	1
Black-crowned night heron (*Nycticorax nycticorax nævius*)	10
Snowy egret (*Egretta candidissima*)	3
Great white heron (*Herodias egretta*)	1
Great blue heron (*Ardea herodias*)	2
Great black-crowned heron (*Ardea cocoi*)	1
Boatbill (*Cancroma cochlearia*)	2
Black stork (*Ciconia nigra*)	1

rk (*Leptoptilus dubius*)	1
Mycteria americana)	2
(*Ibis æthiopica*)	8
Guara alba)	18
onbill (*Ajaja ajaja*)	2
amingo (*Phœnicopterus ro-*	2
wan (*Olor columbianus*)	6
(*Cygnus gibbus*)	6
d swan (*Cygnus melancory-*	2
(*Chenopis atrata*)	8
goose (*Plectropterus gam-*	1
ck (*Cairina moschata*)	2
covy duck (*Cairina mos-*	1
(*Aix sponsa*)	18
uck (*Dendronessa galericu-*	10
goose (*Cereopsis novæ-hol-*	2
goose (*Chen hyperboreus*)	8
w goose (*Chen hyperboreus*	1
(*Chen rossi*)	2
hite-fronted goose (*Anser gambeli*)	5
goose (*Anser indicus*)	2
se (*Anser cygnoides*)	2
se (*Branta canadensis*)	12
goose (*Branta canadensis i*)	8
ose (*Branta canadensis mi-*	2
ose (*Chloëphaga magella-*	1
tree duck (*Dendrocygna*	2
Fulvous tree duck (*Dendrocygna bicolor*)	2
Wandering tree duck (*Dendrocygna arcuata*)	6
Ruddy sheldrake (*Casarca ferruginea*)	1
Mallard (*Anas platyrhynchos*)	19
East Indian black duck (*Anas sp.*)	6
Black duck (*Anas rubripes*)	2
European widgeon (*Mareca penelope*)	2
Chilean widgeon (*Mareca sibilatrix*)	2
Pintail (*Dafila acuta*)	2
Blue-winged teal (*Querquedula discors*)	5
Rosy-billed pochard (*Metopiana peposaca*)	2
Red-headed duck (*Marila americana*)	9
American white pelican (*Pelecanus erythrorhynchos*)	9
European white pelican (*Pelecanus onocrotalus*)	2
Roseate pelican (*Pelecanus roseus*)	2
Brown pelican (*Pelecanus occidentalis*)	5
Australian pelican (*Pelecanus conspicillatus*)	2
Florida cormorant (*Phalacrocorax auritus floridanus*)	15
Water turkey (*Anhinga anhinga*)	8
Great black-backed gull (*Larus marinus*)	1
American herring gull (*Larus argentatus smithsonianus*)	8
Laughing gull (*Larus atricilla*)	2
South African ostrich (*Struthio australis*)	6
Somali ostrich (*Struthio molybdophanes*)	1
Common cassowary (*Casuarius galeatus*)	1
Common rhea (*Rhea americana*)	2
Emu (*Dromæus novæ hollandiæ*)	2

REPTILES.

lligator mississippiensis)	22
tortoise (*Cistudo ornata*)	2
nd tortoise (*Testudo ephip-*	2
sland tortoise (*Testudo vi-*	1
rd (*Phrynosoma cornutum*)	1
r (*Heloderma suspectum*)	2
n (*Python reticulatus*)	8
a (*Boa constrictor*)	5
boa (*Corallus cookii*)	1
Eunectes murinus)	1
e (*Epicrates cenchris*)	2
dder (*Heterodon platyrhi-*	1
Black snake (*Zamenis constrictor*)	1
Coach-whip snake (*Zamenis flagellum*)	1
Water snake (*Natrix sipedon*)	8
Common garter snake (*Eutænia sirtalis*)	8
Texas water snake (*Eutænia proxima*)	2
Pine snake (*Pituophis melanoleucus*)	5
King snake (*Ophibolus getulus*)	2
Water mocassin (*Ancistrodon piscivorus*)	6
Copperhead (*Ancistrodon contortrix*)	1
Diamond rattlesnake (*Crotalus adamanteus*)	5

STATEMENT OF THE COLLECTION.

ACCESSIONS DURING THE YEAR.

	60
	225
hatched in the National Zoological Park	88
in exchange	82
in National Zoological Park	43
al	498

SUMMARY.

Animals on hand July 1, 1914	1,362
Accessions during the year	498
	1,860
Deduct loss (by exchange, death, return of animals, etc.)	463
On hand June 30, 1915	1,397

Class.	Species.	Individuals.
Mammals	151	689
Birds	185	636
Reptiles	22	72
Total	358	1,397

VISITORS.

The number of visitors to the park during the year, as determined by count and estimate, was 794,530, a daily average of 2,176. This was the largest year's attendance in the history of the park. The greatest number in any one month was 153,452 in April, 1915, an average per day of 5,115.

Sixty-two schools, classes, etc., visited the park, with a total of 3,485 individuals.

IMPROVEMENTS.

A cage for pumas was built near the lion house. The cage is 22 by 28 feet, 10 feet high, and attached to it is a well-built shelter house, which provides four compartments for the animals and ample space for the keeper in caring for them.

In order to provide for keeping a band of rhesus monkeys out of doors throughout the year, a small shelter house with thick wooden walls was built and connected with it a yard 25 feet square. Twenty-five monkeys were placed there in October; all came through the winter in good shape except one, which was taken out as it appeared to suffer from the cold.

A new machine lathe was added to the shop equipment, replacing one of inferior type which had been in use since the early years of the park. A tool grinder and power hack saw were also installed and overhead equipment of shafting and pulleys arranged for the several machines. A food chopper and bone grinder, with motor for driving them, were put in at the food house.

For the convenience of the increasing number of people who enter at the south end of the park, a foot bridge was constructed there across the creek. A small rustic shelter was also built near the new stone bridge.

The most important improvement undertaken was a building for hospital and laboratory. The construction of this was begun near the end of the year, part of the cost being met from this year's appropriation and the balance to come from the appropriation for the following year. The total cost is expected to be about $5,000. The building will be of stone, 30 by 56 feet, and one story high. There will be a room at each end fitted up for the accommodation of animals, and between these a laboratory room, 16 by 27 feet. Each room will be provided with four skylights. The location selected for the building is entirely separate from all other animal quarters, but yet easy of access for those who will have charge of the animals that are kept in it.

The cost of these improvements was as follows:

Hospital and laboratory (1915 appropriation)	$2,300
Cage and house for pumas	1,325
Outdoor cage and house for monkeys	250
Additional machine-shop equipment	700
Additional equipment for food house	250
Footbridge	325
Rustic shelter at new stone bridge	210

MAINTENANCE OF BUILDINGS, INCLOSURES, ETC.

The roads and walks in the park had received almost no repair since 1910, when a special appropriation was made for that purpose. Their condition had become so bad that repairs had to be made early in the year. The roads were extensively patched and given a general surfacing throughout with tar and crushed stone, over 2 miles of roadway being thus treated. Portions of the walks were repaired in the same manner. The total area of roads and walks repaired was 8,330 square yards. The ford near Klingle Road also had to be thoroughly repaired, and toward the close of the year it became necessary to pave with concrete the ford on the driveway to Cathedral Avenue, which, from the effects of high water and heavy ice in the creek, had become impassable. The total cost of this road work was $4,075 (upper ford $325, lower ford $615).

It was also necessary to clean out and repair the larger pond for waterfowl, in which an extensive bank of sand and mud had been deposited at time of flood by the water supply from the creek; this cost $850.

Progressive deterioration of the temporary bird house again made repairs necessary there. The wooden floor, which had already been rebuilt twice, was replaced with concrete, as was also a part of the wooden foundation. The cost of this work was $700. This building is an example of the ultimate costliness of cheap temporary construction.

The roof of the office building had to be reshingled and some other repairs made at a cost of $400.

The section of the heating main between the temporary bird house and the antelope and elephant houses was repaired and a considerable part of the pipe replaced. A new hot-water boiler, for auxiliary heating of snake cases, was also put in at a total cost of $500.

ALTERATION OF THE WEST BOUNDARY OF THE PARK.

The acquisition of the land required to extend the park to Connecticut Avenue from Cathedral Avenue to Klingle Road, for which an appropriation of $107,200 was made in the sundry civil act for the fiscal year ending June 30, 1914, has not yet been accomplished.

There was great delay at several stages in the proceedings for the condemnation of the land. A special survey and map of the property involved was required; the preliminary proceedings were then postponed from time to time in order that the property owners interested might submit arguments regarding the instructions to be given to the jury of condemnation; the work of the jury in arriving at the value of the land to be taken and the amount of benefits which should be assessed against neighboring property occupied several months; the hearing by the court of objections on the part of property owners to the verdict further delayed the matter, especially as the time of that court from November, 1914, to May, 1915, was almost entirely occupied by the contest in an important will case. Changes in the personnel of the court and of the Government attorneys also operated to delay and complicate the matter. The court finally, on June 28, 1915, confirmed the verdict of the jury as regards the awards of damages for land to be taken and a portion of the benefits assessed against neighboring property, but set aside the verdict as to benefits in all cases where the owners of the property had filed exceptions to the verdict. The amount awarded for the land to be taken was $194,438.08, and to this is to be added the cost of the proceedings, $2,203.35, making a total of $196,641.43. The benefits were assessed at $66,013.50, but a considerable part was set aside by the court. The exact amount that is involved in this decision of the court has yet to be determined by the Government attorneys upon examination of the land records.

The total amount required to purchase the land and meet the costs of condemnation will therefore be considerably greater than the sum that was appropriated, so that an additional appropriation will have to be obtained in order to secure all of the land for which the act provides.

ROCK CREEK INTERCEPTING SEWERS.

District of Columbia completed the construction of the main
pting sewer through the park in October, 1914, and shortly
ter built a large connecting sewer to this from the intercept-
ver that had been constructed through the park some years
In accomplishing this work there was necessarily a con-
le amount of destruction and defacement of natural features
he line of the work. The District authorities and the con-
have removed the excavated material and restored the ground
riginal condition so far as that is practicable, but some ex-
re on the part of the park and considerable time will be re-
to bring it again into satisfactory condition.

PLAYGROUND PRIVILEGE.

s request, the playground department of the District of Co-
was allowed to install several pieces of apparatus on a meadow
ich is a favorite resort of picnic parties. The apparatus has
ite largely used. Objectionable features thus far have been
mporary disfigurement of an attractive part of the park and
dency to extend playground operations beyond the area that
otted for that purpose.

IMPORTANT NEEDS.

BUILDINGS.

importance of providing certain permanent buildings for
the collection and for other purposes has been urged for
years past, but, with the scanty means available, all that
e done was to provide, from two yearly appropriations, a small
g to meet the bare necessities of a hospital and laboratory.
ary building is still a most urgent need, and repeated efforts
een made to secure an appropriation for this purpose. A
g to accommodate elephants, hippopotami, and certain other
s whose requirements as to housing and care are similar will
a necessity, as the present temporary quarters are already
ll and insecure for the young animals, which are rapidly grow-
l acquiring formidable strength.

need of a public-comfort and restaurant building has been
repeatedly and attention called to the fact that the facilities
it has been possible thus far to provide are altogether inade-
nd not befitting a public institution of this character.

houses should be provided at the principal entrances, all of
re at considerable distance from the exhibition buildings, and

they should include a small room for watchmen and limited t facilities for visitors.

PREPARATION OF SITES FOR BUILDINGS.

The park includes but little ground that is even comparati level, and in order to provide a building site of any conside extent it is usually necessary to grade off a hill or fill up a va This involves the destruction of the trees and shrubs on the area their replacement after the grading is completed by others req about the building for shade and ornament. Early preparatio such sites is highly desirable, in order that the planting may be in advance and as much time as possible utilized for growth, espec of trees for shade. The site that has been selected for the a will require grading over practically the entire area needed fo building, the attached outdoor cages, and the walks about t This would involve the excavation and removal of some 14,000 yards of earth. The location is indicated at *A* on the accompan map, which also shows where the excavated material could be us fill a deep, narrow valley adjoining the bear yards at *B*. N 70,000 square feet of ground would thus be made available at aviary site and some 34,000 square feet would be added to the u area where the fill is made. It is estimated that the cost of this would be about $4,000, and it is recommended that Congres asked to appropriate that sum for the purpose.

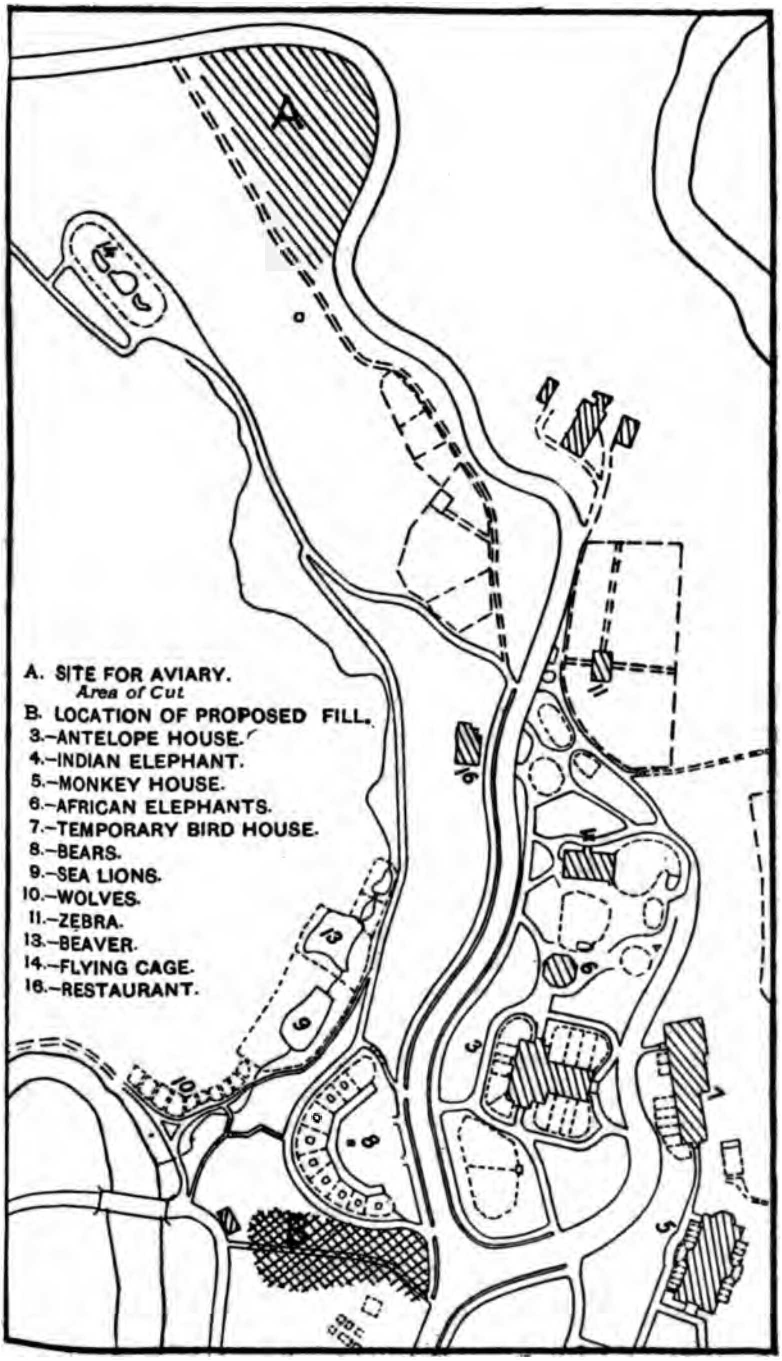
ADDITIONS TO THE COLLECTION.

Attention is again called to the desirability of adding to exhibit some of the more important animals which it still lacks, as anthropoid apes, rhinoceros, giraffe, African buffalo and a lopes, and the mountain sheep and goat of our own country.

Respectfully submitted.

FRANK BAKER,
Superintende

Dr. CHARLES D. WALCOTT,
Secretary of the Smithsonian Institution.


A. SITE FOR AVIARY.
Area of Cut
B. LOCATION OF PROPOSED FILL.
3.–ANTELOPE HOUSE.
4.–INDIAN ELEPHANT.
5.–MONKEY HOUSE.
6.–AFRICAN ELEPHANTS.
7.–TEMPORARY BIRD HOUSE.
8.–BEARS.
9.–SEA LIONS.
10.–WOLVES.
11.–ZEBRA.
13.–BEAVER.
14.–FLYING CAGE.
16.–RESTAURANT.
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B
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APPENDIX 5.

REPORT ON THE ASTROPHYSICAL OBSERVATORY.

SIR: I have the honor to present the following report on the operations of the Smithsonian Astrophysical Observatory for the year ending June 30, 1915:

EQUIPMENT.

The equipment of the observatory is as follows:

(*a*) At Washington there is an inclosure of about 16,000 square feet, containing five small frame buildings used for observing and computing purposes, three movable frame shelters covering several out-of-door pieces of apparatus, and also one small brick building containing a storage battery and electrical distribution apparatus.

(*b*) At Mount Wilson, Cal., upon a leased plat of ground 100 feet square, in horizontal projection, are located a one-story cement observing structure, designed especially for solar-constant measurements, and also a little frame cottage, 21 feet by 25 feet, for observer's quarters.

Upon the observing shelter at Mount Wilson there is a tower 40 feet high above the 12-foot piers which had been prepared in the original construction of the building. This tower is being equipped with a tower telescope for use when observing (with the spectrobolometer) the distribution of radiation over the sun's disk. This has been made possible by an appropriation by Congress of $2,000 for this purpose.

During the year apparatus for research has been purchased or constructed at the observatory shop. The value of these additions to the instrumental equipment, not counting the tower equipment above mentioned, is estimated at about $500.

WORK OF THE OBSERVATORY.

AT WASHINGTON.

Observations were made for the testing of pyrheliometers. As in former years several silver-disk pyrheliometers were prepared and sent abroad by the Institution after standardization at the Astrophysical Observatory.

Several automatic recording pyrheliometers were raised to great ights in sounding balloon experiments at Omaha early in July, 14. These instruments were all recovered, and the one which made e most successful flight was received back entirely uninjured. A reat many experiments were made with it at Washington to invesgate certain peculiarities of its record, and to more thoroughly andardize its pyrheliometric and barometric elements. These exeriments consumed much time of the director and Mr. Aldrich. he results reached from these balloon pyrheliometer records will summarized below.

Further experiments were made with sky-radiation apparatus.

As in former years the major portion of the time of Mr. Fowle d Miss Graves, and a considerable part of that of Mr. Aldrich d Mr. Carrington, has been used in measuring and reducing the ount Wilson bolographic data. This work is heavier than forerly, as it now includes the tower-telescope observations on the disibution of brightness along the sun's diameter. These are now ade at seven different wave lengths of the spectrum on each day at solar-constant measurements are secured. Owing to the deands of the Mount Wilson work, Mr. Fowle has devoted but little me to his research on the transmission of long-wave rays in air ntaining water vapor.

The instrument maker, Mr. Kramer, was occupied mainly on the nstruction of sky-radiation apparatus, and on many improvements r the Mount Wilson tower telescope.

AT MOUNT WILSON.

Observations by Messrs. Abbot and Aldrich were continued at ount Wilson from July to about November 1, 1914, and were begun gain about June 1, 1915. As in former years measurements of solar idiation were made on every favorable day, with the purpose of llowing the course of the solar variation. On each day of observaon the distribution of brightness along the diameter of the solar nage of the tower telescope was also observed at seven different ave lengths.

AT OMAHA.

As stated in last year's report, Mr. Aldrich, in cooperation with r. Blair and other representatives of the United States Weather ureau, made sounding-balloon experiments at Omaha early in uly, 1914. Three flights with automatic recording pyrheliometers ere made on July 1, 9, and 11, respectively. The first was made at ight, with electric lamps for recording, as a test of certain anticiated sources of error. In the second flight the instrument was much damaged when landing and remained a great while undiscovered, so that the record was quite spoiled. Apparently, too, the clockwork had stopped before reaching a very great elevation. The third flight was highly successful.

RESULTS OF BALLOON PYRHELIOMETRY.

A complete account of the balloon pyrheliometers, the circumstances of the flights, and the results obtained has been published in a paper by Messrs. Abbot, Fowle, and Aldrich, entitled, "New Evidence on the Intensity of Solar Radiation Outside the Atmosphere" (Smithsonian Miscellaneous Collections, vol. 65, No. 4, 1915). The following is a summary of the principal results:

In the flight of July 11, 1915, the balloons reached an elevation of approximately 25,000 meters, or 81,000 feet. The pressure of the air remaining above the instrument was approximately 3 centimeters, or 1.25 inches of mercury, about one twenty-fifth of the barometric pressure at sea level. Seven readable measurements of solar radiation were recorded at various levels. Of these the three near highest elevation were the best. Their mean gives a value of 1.84 calories per square centimeter per minute, as the intensity of solar radiation at mean solar distance, at noon on July 11, at the altitude of about 22,000 meters, or 72,000 feet. It appears reasonable to add about 2 per cent for the quantity of solar radiation absorbed and scattered by the air above the instrument. This gives 1.88 calories as a value of the solar radiation outside the atmosphere, on this day, according to the balloon pyrheliometry. Unfortunately no solar-radiation measurements were secured on Mount Wilson on July 11, but the result falls well within the range of values for the solar constant of radiation which have been obtained by the bolometric method at various stations, and compares well with the mean of these values, 1.93 calories.

UNIFORMITY OF ATMOSPHERIC TRANSMISSION AT MOUNT WILSON.

In solar-constant measurements on Mount Wilson the atmospheric transmission for vertical rays is determined in the following manner for numerous spectrum wave lengths:

Spectrobolographic observations are made at different zenith distances of the sun, usually between 75° and 30°. Between these limits the length of the path of the rays within the atmosphere is proportional to the secant of the zenith distance. Knowing the length of path and the intensity of the transmitted rays, the coefficient of transmission for any ray is readily computed. In this determination it is assumed that the atmosphere remains unchanged in transparency during the whole period of observation. Several critics have objected against the Mount Wilson measurements that a progressive decrease of transparency occurs during the morning hours, and especially during the period ordinarily used in our observations, so that our estimates of atmospheric transmission are in their view too high, and our solar-constant values too low in consequence. It has been suggested by one critic that the period during which the zenith distance of the sun changes from 85° to 75° would be more suitable for the work.

To test this matter, observations were begun at sunrise on September 20 and 21, 1914, and continued until 10 o'clock, the usual closing time. These days were exceptionally clear and very dry, and seemed well suited to give excellent solar-constant values. The conditions of experiment, discussion of observations, and results are given in full in the paper by Abbot, Fowle, and Aldrich above cited. The principal results are these: No considerable difference in transmission coefficients appeared whether these were based on the whole morning's observations, on the range of air masses usually employed, or on the range recommended by the critic above mentioned. Six solar-constant values were derived for the two days, based on these three different treatments of the data. All six values fall between 1.90 and 1.95 calories per square centimeter per minute, in good agreement with values obtained as usual on other days. The experiments confirm the view that the atmospheric transparency above Mount Wilson is sufficiently uniform for the purposes of solar-constant investigations.

LONG-PERIOD VARIATION OF THE SUN.

In the year 1913 the solar activity, as judged by the prevalence of sun spots, was less than at any time for about a century. The mean of all solar-constant values obtained at Mount Wilson from July to October, 1913, inclusive, was 1.885 calories per square centimeter per minute. This value falls 2.5 per cent below the mean value for the years 1905 to 1912, which was 1.933 calories.

Beginning September 9, 1913, observations of the distribution of radiation along the diameter of the solar disk were secured on about 15 days of September, October, and November. These showed that the increase (or contrast) of brightness of the center of the sun's disk over that which prevails near the edge was less than that which was found from Washington observations of the years 1905 to 1907.

In the year 1914 the solar activity became distinctly greater than in 1913. The number of spots, to be sure, was not great, but other phenomena joined in showing that the period of maximum sun spots was about to come. The mean of all solar-constant values obtained at Mount Wilson from June to October, inclusive, was 1.950 calories.

This value is 3.5 per cent above that of 1913 and 1 per cent above the mean for former years. Indications are that the value for 1915 will also fall very high.

The contrast of brightness between the center and edges of the solar disk was greater in 1914 than in 1913, and, in fact, almost as great as was found from Washington work of 1905 to 1907.

These facts confirm the result derived from earlier observations, namely, the solar emission of radiation varies along with the solar activity as revealed by sun spots and other phenomena. Higher values of solar radiation prevail at times of greater solar activity, as expressed by sun spots. The connection does not, however, appear to be a strictly numerical one between solar radiation and sun spot numbers. In the return of solar activity presaged in 1914 the solar radiation rose almost to its maximum value before the number of sun spots had greatly increased. Associated with these changes, greater contrast of brightness between the center and edges of the solar disk prevails when the solar activity is greater.

SHORT-PERIOD VARIATION OF THE SUN.

In the year 1913, as in former years, considerable fluctuations of the solar-constant values occurred from day to day. The values found ranged over nearly 10 per cent between the extreme limits 1.81 and 1.99 calories, but seldom more than 3 per cent in any 10-day interval. The periods of fluctuation were irregular, as heretofore. Associated with these fluctuations, though perhaps not strictly connected numerically, the contrast of brightness between center and edges of the solar disk also varied. Curiously enough, however, the correlation between solar-constant values and contrast values proves to be of opposite sign for these short irregular fluctuations to that which attends the long-period changes which are associated with the general solar activity. In other words, in the progress of the sun spot cycle *high* solar-constant values and *increased* contrast between center and edges of the solar disk are associated together with numerous sun spots, but for the *short* irregular period fluctuations of solar radiation, *higher* solar-constant values are associated with *diminished* contrast of brightness along the diameter of the solar disk. The year 1914 was singularly free from large fluctuations of solar radiation. The extreme range of solar-constant values was only 4 per cent between limits 1.91 and 1.99 calories. Accordingly the year was not very favorable for testing the relation just described. Nevertheless, the results tend to confirm rather than disprove the conclusion reached that for short, irregular fluctuations of the solar radiation high values are associated with less contrast of brightness between the center and edges of the sun.

The somewhat paradoxical conclusions above stated seem capable f explanation as follows: Associated with the great increase of olar activity attending the maximum of the sun spot cycle, increased onvection is continually bringing fresh hot material to the sun's urface, so that the effective solar temperature is then higher, and reater emission of radiation prevails. At such a time the contrast, hich would be zero if the solar temperature were zero, is naturally lso increased. As for the quick, irregular fluctuations, it must be upposed that the sun's outer envelope hinders somewhat the passage f radiation from within outward. This hindrance is greater at the dges of the sun's disk, where the path of the rays in the line of ight is oblique, than it is at the center of the sun's disk. Suppose ow that the obstructive property of these layers varies from day to ay. When their transparency is increased the solar radiation must *crease;* but as the effect will be most conspicuous at the edge of the lar disk, where the path of the rays is longest, the *contrast* of rightness between center and limb must thereby *decrease.*

Two kinds of causes may, therefore, contribute to the sun's vari- bility. The one, a change of effective temperature attending the eneral march of solar activity, may cause the variability of long eriod. The other, a change of opacity of the outer solar layers, ay cause the variability of short irregular period.

SUMMARY.

Successful records of the intensity of solar radiation up to 25,000 eters were secured by means of automatic recording pyrhelio- eters attached to sounding balloons. The mean of the three highest alues reduced to mean solar distance is 1.84 calories per square ntimeter per minute. Making 2 per cent allowance for scattering nd absorption in the air above (which gave a barometric pressure nly about one twenty-fifth of that at sea level), the value 1.88 lories is obtained as the probable intensity of solar radiation out- de the atmosphere at mean solar distance on this day. This value lls near the mean of numerous values obtained by spectrobolo- etric observations on Mount Wilson.

Experiments begun at sunrise and continued until 10 o'clock on eptember 20 and 21, 1914, indicate great constancy of transparency f the atmosphere above Mount Wilson, and yield solar-constant alues independent of the altitude of the sun. These results con- rm the substantial accuracy of the Mount Wilson observations of e solar constant of radiation.

The radiation of the sun was 2.5 per cent below the mean, accord- g to the average of observations extending from July to October, 1913, inclusive, and 1 per cent above the mean from similar studies extending from June to October, 1914, inclusive. A high average value for 1915 is indicated.

The contrast of brightness between the center and edges of the solar disk was less in 1913 than in 1905 to 1907, but was restored to the earlier condition in 1914.

Short-period fluctuations of solar radiation were large in 1913, but small in 1914. Associated with these quick, irregular fluctuations are found variations of contrast of brightness between the center and edges of the solar disk. Curiously enough, while greater contrast is associated with greater solar radiation and with numerous sun spots in the general march of the sun's activity, lesser contrast is associated with greater solar radiation in the march of the quick, irregular fluctuations of the sun's emission.

This paradox points to two causes of solar variation—the long-period changes may probably be caused by changes of the sun's effective temperature attending the march of solar activity; the quick fluctuations may be ascribed to changes of the transparency of the outer solar envelopes.

Respectfully submitted.

C. G. Abbot,
Director Astrophysical Observatory.

Dr. C. D. Walcott,
Secretary of the Smithsonian Institution.

APPENDIX 6.

REPORT ON THE LIBRARY.

SIR: I have the honor to submit the following report upon the perations of the library of the Smithsonian Institution and its ranches for the fiscal year ending June 30, 1915:

In common with other libraries of the world, the Smithsonian brary has had to confront a serious situation during the last year. his was the difficulty experienced in the securing of current parts nd the completing of sets of the publications of learned institutions nd scientific societies that have been received from European sources or many years. Some of these series have ceased publication, others ave been published with fewer pages and in smaller editions, while till others have been issued but not forwarded, all due largely to he military service required of the contributors and publishers at his time at the front and the risk involved in transportation. Notwithstanding these conditions, the efforts to keep the library exchanges alive have been continued with marked success.

ACCESSIONS.

During the fiscal year a total of 26,928 packages of publications were received, of which 25,097 came through the mails and 1,831 hrough the International Exchange Service. The correspondence ecessary in connection with these receipts numbered about 1,400 etters, requesting publications and acknowledging them, and 5,148 cknowledgments on the regular form.

The publications for the Smithsonian library were entered, accessioned, and forwarded to the Smithsonian deposit in the Library of ongress each day as received, numbering in all 24,713 publications, s follows: 3,043 volumes, 1,179 parts of volumes, 1,763 pamphlets, 7,410 periodicals, 594 charts, and 724 parts of serials to complete ets. The numbers in the accession record run from 517,777 to 521,616. There were catalogued during the year 3,451 publications, of which 1,000 were charts. Four thousand one hundred and twenty-two volumes were recatalogued from the old records and entered in the new catalogue. The cards typewritten and filed in the catalogue numbered 4,038.

The sending to the Library of Congress of public documents presented to the Smithsonian Institution, without stamping and recording, has been continued, and 4,675 were forwarded in this way.

The accessions for the office library, which includes the Astrophysical Observatory and the National Zoological Park, numbered 561 publications, distributed as follows: 351 volumes, 35 parts of volumes, and 40 pamphlets, for the office library; 72 volumes, 11 parts of volumes and 25 pamphlets for the Astrophysical Observatory, and 21 volumes and 6 pamphlets for the National Zoological Park.

Complete sets of inaugural dissertations and technological publications from 12 universities and technical high schools were received from the following places: Baltimore, Basel, Copenhagen, Delft, Ithaca, Lund, Paris, Philadelphia, Toulouse, and Zürich.

EXCHANGES.

The sendings from Europe have been restricted compared with those of former years, but there has been no cessation in the efforts to secure new exchanges and missing parts in the series, and many have been received. The new series added to the library numbered 48, and all of the 387 want cards for the series searched in the Library of Congress were considered and some action taken on each at the Smithsonian Institution, with the result that 82 sets of publications of learned institutions and scientific societies in the Smithsonian division were entirely or partially completed by the supplying of 460 parts; in the same way 254 parts of 48 sets were supplied to the periodical division, and for the part of the deposit in the general classification 10 parts of 4 sets.

Among the more important of these series secured for the Smithsonian library may be cited the following:

Australia:
  Sydney, New South Wales.—Royal Anthropological Society of Australasia. Science of Man.
Belgium:
  Brussels.—Académie Royale de Belgique. Bulletin, Classe des lettres. Association des industriels de Belgique pour l'étude et la propagation des engins et mésures propres à préserver les ouvriers des accidents du travail. Rapport.
  St. Nicholas.—Cercle archéologique du pays de Waes. Annales.
England:
  London.—Agricultural Economist and Horticultural Review.
    Royal Geographical Society. Geographical Journal.
  Birmingham.—Birmingham Natural History and Microscopical Society. Report.
France:
  Nice.—Association Procincials des architectes français. Bulletin.
  Paris.—Société Française de Physique. Résumé des communications.

rmany:
  Berlin.—Berliner Missionsgesellschaft. Berliner Missions-Berichte.
    Deutscher Fischerei-Verein. Zeitschrift fuer Fischerei.
  Darmstadt.—Historischer Verein fuer das Grossherzogthum Hessen. Quartalblätter.
  Dresden.—K. Oeffentliche Bibliothek. Papyrus-Fragment aus der Kgl. Oeff. Bibliothek zu Dresden.
  Munich.—K. Bayerische Akademie der Wissenschaften. Abhandlungen, Denkschriften Gelehrte Anzeiger Sitzungsberichte.
dia:
  Calcutta.—Medical and Sanitary Departments of India. Scientific Memoirs by the Officers of the Medical and Sanitary Departments.
aly:
  Florence.—Societa Botanica Italiana. Bullettino.
am:
  Bangkok.—Siam Society. Journal.

The exchange of publications with historical societies in this coun-y and abroad has been continued, resulting in many additions both the form of new exchanges and the supplying of missing parts.

READING ROOM.

In the reading room the current foreign and domestic scientific eriodicals have been in constant use by the staff and the members f the scientific bureaus of the governmental establishments in Washngton, and there are now 294 titles on the shelves. Three thousand ive hundred and three publications from the reading and reference ooms were circulated during the year. Of these 3,161 were single umbers of periodicals, and 342 were bound volumes.

THE AERONAUTICAL LIBRARY.

One of the important collections of reference works at the Institution is that relating to aeronautics, and is, in all probability, the most complete series on this subject in the United States. The collection had its origin with Secretary Langley when he was carrying on his aeronautical experiments, at which time he was able to secure many early works that can not now be purchased.

One of the chief contributors during the year was Dr. Alexander Graham Bell, a Regent of the Institution, whose gift consists of his working library on the subject, numbering 46 volumes, and another series of 153 volumes of newspaper clippings relating to the important period when the Wright brothers were making their initial flights.

The additions to the collection during the year, including those from Dr. Bell, were 256.

ART ROOM.

Mrs. Charles D. Walcott has added to the collection of works on art an exceptionally valuable loan, consisting of nine magnificent volumes on Japanese art, fully illustrated in color. Mrs. Walcott has also deposited the architectural publications, numbering 394 volumes, and parts of serial publications which formed the library of her brother, George Vaux, an architect of prominence in the city of Philadelphia.

EMPLOYEES' LIBRARY.

The employees' library has also received a contribution from Mrs. Walcott by the deposit of a collection of popular works, numbering 145 volumes.

NEW STEEL STACKS.

The work on the new steel stacks for the books belonging to the libraries of the Government bureaus under the Smithsonian Institution has been continued, and at the close of the year this work is nearly completed. With the passage of the appropriation bills in August, 1914, the additional sum of $10,000 became available, and immediately an order was issued for the erection of as much of the second half of the stacks in the west end of the main hall as the money available would permit. Those in the east end were completed in August, and the moving of the library of the Bureau of American Ethnology to its new quarters was accomplished within a very short time. The old wooden galleries in the west end were then removed and this part of the hall was turned over to the contractors for th erection of stacks. Congress having appropriated an additional sum of $6,500 during the last session, the steel stacks were practicall finished at the close of the year.

The libraries of the Government bureaus under the Institution hav heretofore been cared for in the bureau offices and wherever there wa space for shelving. Proper classification and arrangement were in possible, owing to lack of space, and much time was lost in looking fo references. The new stacks have a capacity of 100,000 volumes, an make it possible for the first time to bring all publications relating t one subject together, so that each is available for consultation.

UNITED STATES NATIONAL MUSEUM.

It seems desirable, after a period of a third of a century, to briefl review the growth and progress that have been made in the Museu library. The formation of a working library in the Nation Museum in 1881 was largely due to the increased activity in invest gations and the need of reference works for the curators in their study of the collections which were moved from the Smithsonian Building to the separate building erected for the Museum.

A nucleus was begun in the northwest corner of the Museum building with a collection of publications for the most part made up of standard zoological and industrial works and bound pamplets, composing the library of Spencer Fullerton Baird, second Secretary of the Smithsonian Institution, which he had presented to the Museum. The Library has grown steadily until it now occupies not only the old rooms, but additional larger quarters in the new building as well as space for the special libraries in the various sections. Within a year after the first books had been brought together there were 5,450 volumes and 4,750 pamphlets; in all, 10,200 publications. Now, in the thirty-fifth year of its existence, there are 45,818 bound volumes, 76,295 pamphlets, forming a collection of 122,113 titles, from which the duplicates have been removed.

The system of arrangement has been modified to some extent, but the plan upon which the Museum library was organized has been continued, in that the general library has retained all books treating of more than one subject, such as periodicals, proceedings of societies, dictionaries, and encyclopedias, together with such monographs as are not constantly needed in the sectional libraries; and the sectional libraries have had assigned to them only those publications which relate to the work of the department or division. A little more than a year ago the general library and works relating to anthropology, biology, and geology were moved to new quarters in the new building, where up-to-date facilities for the consultation of publications have been provided.

This left the old rooms where the library had had its inception free, and the space thus made vacant is now being used for the accumulation of another collection of works of reference of equal importance relating to history and the collections of arts and industries of a technical nature, which are being developed in the older Museum Building. While this library has but recently been started, the indications are that it will have a growth equal to that of the parent library, and it promises to become one of the most important technical series of publications in the country.

The establishment of sectional libraries of special reference works bearing on the collections has been of importance to the curators, and the number has been increased in proportion to the growth of the Museum. Beginning with 8 in 1881, there are now 33 collections of publications on special subjects.

Considering the ways and means for adding to the library in the early days, its growth has been remarkable. The library for the first 18 years was dependent largely for its increase upon the exchange of the publications of the Museum descriptive of its collections in the various fields of science. This plan for increasing the library was very successful, but it did not provide books of reference, in part published at a loss, which could only be secured by purchase. In 1898 an appropriation of $2,000 was made by Congress for the purchase of such books, but this sum was barely adequate then, and while the appropriation has been continued, it has not been increased. This lack of sufficient funds will be more keenly felt in the very near future, owing to the present conditions in Europe and the inability of the scientific societies and institutions abroad to supply even exchange copies.

ACCESSIONS.

The Museum library now contains 45,818 volumes, 76,295 pamphlets and unbound papers, and 124 manuscripts. The accessions during the year covered by this report number 2,209 volumes, 2,530 pamphlets, and 183 parts of volumes.

CATALOGUING.

The books catalogued number 1,550, pamphlets 2,530, and the total number of cards made 4,664; completed volumes of periodicals catalogued, 756; parts of publications, 183; parts of periodicals, 9,805; new periodical cards made, 389.

The old catalogue of the Museum library was entered on cards of about twice the size of the standard card now in use without sufficient information for the proper identification of the publication. For a number of years the recataloguing of these publications on standard cards has been carried on as the other work permitted until at the present time only the publications in the sectional libraries remain. With the continued increase in the work it is hardly possible to do more than recatalogue 100 volumes in a year, but with additional help this work could be completed at once, and would be of great value to the Museum in connection with reference work.

EXCHANGES.

The existing conditions in Europe have interfered to some extent with the securing of new exchanges as well as with the receipt of publications which have been coming for many years. In the matter of exchanges and the securing of publications needed to complete the series 297 letters were written, with the result that many new titles of publications issued in series were added to those already coming. The receipts of publications from abroad have been delayed, and in many cases the institutions and societies are holding the ts and series until it will be safe to transmit them. Also, for onomic reasons, only limited editions with fewer pages are issued, hich gives a special value to those received.

LOANS.

The use of the library has been largely by the scientific staff of he Museum, but other departments of the Government, particuarly the Department of Agriculture, have availed themselves of the opportunity of consulting the publications relating to the various branches of science. During the year the loans from the general library numbered 12,492 publications, which includes 5,272 books assigned to the sectional libraries, 3,020 books borrowed from the Library of Congress, 111 from the Department of Agriculture library, 72 from the United States Geological Survey, 44 from the Army Medical Museum and Library, and 13 from other places. From the Museum shelves there were borrowed 3,960 volumes.

One of the important matters considered during the latter part of the year was the return of books that had been borrowed from the Library of Congress on the older records, and while only the charges for books coming under the first three letters of the alphabet were acted upon, the indications are that those running back as far as 1876 will be cleared up. During the year 3,437 books were returned to the Library of Congress and 294 to other libraries.

BINDING.

The binding of volumes received in separate parts is still a serious matter, and it is hoped that some provision can be made at an early date, so that all of them may be bound. To cite an instance, there are now in the technical series of recently catalogued works over 100 volumes that should be bound at once, in order that they may be preserved intact.

There were 812 volumes prepared for binding and sent to the Government bindery.

GIFTS.

Gifts of importance have been received from the following persons: Dr. Charles Doolittle Walcott, Mrs. Richard Rathbun, Dr. William Healey Dall, Dr. Oliver Perry Hay, Dr. Charles W. Richmond, Mr. George C. Maynard, Dr. Robert W. Shufeldt, Mr. Austin Hobart Clark, Mr. Robert Ridgway, Dr. Joseph Nelson Rose, Dr. I. M. Casanowicz, Mr. William R. Maxon, and also the library of the late Dr. Theodore Nicholas Gill has been presented by Mr. Herbert A. Gill.

DALL COLLECTION.

Dr. William Healey Dall contributed 162 titles, at a cost of about $60, as additions to the collection of books relating to mollusks which has been brought together by him as curator of that division, as a reference library. These and the publications previously received now number approximately 7,662 titles.

BOTANICAL LIBRARY.

A large collection of botanical books, the property of Dr. Edward L. Greene, which had been on deposit in the United States National Museum since 1904, was withdrawn during the year as it was impracticable to secure the sum of $20,000 required for their purchase.

TECHNOLOGICAL SERIES.

In this branch of the library, which has only recently been formed, and which is cared for in the older Museum Building, special efforts have been made to put the classes of publications in more convenient places and to make them more accessible for consultation. Those relating to music, ceramics, photography, and botany have been critically examined, recatalogued, and put in order on the shelves. Those of the following classes have not as yet been considered: Art and architecture, physics, chemistry, history, literature, sociology and economy, and political science.

This branch of the library is very deficient in general reference books, such as an exhaustive encyclopedic work, technical dictionaries, and dictionaries of some of the foreign languages, and while a few of these works can be purchased during the present year, there will not be money available to secure them all.

The additions to this part of the library numbered 1,061 volumes, 3,573 parts of volumes, and 2,631 pamphlets and 4 maps.

The cataloguing for the year numbered 660 volumes, 1,131 pamphlets, and 4 maps, requiring 1,406 cards. The number of periodicals entered on the records were 801 volumes and 6,253 parts of volumes. Special efforts have been made to catalogue the entire collection in the library, and until this is completed the record for cataloguing will not cover the receipts. Books and pamphlets loaned during the year, in addition to those from the general library, numbered 258 volumes and 346 pamphlets, while there were consulted in the reading room about 520 publications. In addition to the work on the catalogue, about 800 volumes and 7,000 pamphlets and parts of volumes were filed on the shelves, to be added to the records later.

In the scientific depository set of printed cards from the Library of Congress about 30,000 were filed alphabetically by authors. This index will be of great value when the subject cards are included, a n contain a complete reference list of publications available jects considered in the Museum.

SECTIONAL LIBRARIES.

progress has been made in the revision of the records for publications which are permanently deposited in the sec- aries it has not been possible to carry the systematic check- far, and my recommendation of last year that a competent be employed to do this special work is renewed. While ition is largely due to the overcrowded condition of the r so many years, it is essential to the work of the Museum sectional libraries should be in perfect order and that the the main library should be complete.

lowing is a complete list of the sectional libraries:

tion.
tive assistant's office.
gy.
e anatomy.
ice.
ts.
e paleontology.
ertebrates.

Materia medica.
Mechanical technology.
Mesozoic fossils.
Mineralogy.
Mineral technology.
Mollusks.
Oriental archeology.
Paleobotany.
Parasites.
Photography.
Physical anthropology.
Prehistoric archeology.
Reptiles and batrachians.
Superintendent's office.
Taxidermy.
Textiles.
Vertebrate paleontology.

BUREAU OF AMERICAN ETHNOLOGY.

rary is administered under the direct care of the ethnolo- arge, and an account of its operations will be found in the that bureau.

ASTROPHYSICAL OBSERVATORY.

tions relating to astrophysics have been assembled in the just completed in the east end of the main hall of the ian Building. This situation is convenient to the observa- the new facilities make it possible for the first time to classify this library. During the year there were added es, 11 parts of volumes, and 25 pamphlets. Fifty-five vol- e bound.

NATIONAL ZOOLOGICAL PARK.

This library contains publications relating to the work of the park in the care of the animals, reports of other zoological parks, and a few works on landscape gardening. The number of publications received was very small as compared with the previous year, and this may be due to the fact that none of the parks abroad, except that at Gizeh, Egypt, issued any publications. During the year there were received 21 volumes and 6 pamphlets.

SUMMARY OF ACCESSIONS.

The following statement summarizes the accessions during the year, with the exception of the library of the Bureau of American Ethnology:

To the Smithsonian deposit in the Library of Congress, including parts to complete sets	7,303
To the Smithsonian office, Astrophysical Observatory, and National Zoological Park	560
To the United States National Museum	4,922
Total	12,785

Respectfully submitted.

Paul Brockett,
Assistant Librarian.

Dr. Charles D. Walcott,
Secretary of the Smithsonian Institution.

Appendix 7.

T ON THE INTERNATIONAL CATALOGUE OF SCIENTIFIC LITERATURE.

ave the honor to submit the following report on the oper-
the United States Bureau of the International Catalogue
fic Literature for the fiscal year ending June 30, 1915:
ternational cooperative enterprise has since 1901 published
ssified index catalogues of the current scientific literature
rld. The following-named branches of science are repre-
ch year by a separate volume: Mathematics, mechanics,
hemistry, astronomy, meteorology, mineralogy, geology,
, paleontology, general biology, botany, zoology, anatomy,
ogy, physiology, and bacteriology.

he first 10 annual issues of 17 volumes each have been pub-
ether with 15 volumes of the eleventh issue, 9 volumes of
th issue, and 2 volumes of the thirteenth issue; a total of
lar volumes in addition to several special volumes of
list of journals, etc.

volumes of the eleventh issue published are mathematics,
, physics, chemistry, astronomy, meteorology, mineralogy,
geography, paleontology, general biology, botany, zoology,
and anthropology.

e volumes of the twelfth issue published are mathematics,
s, physics, chemistry, astronomy, geography, paleontology,
iology, and zoology.

o volumes of the thirteenth issue published are mathematics
gy.

the year there were 26,413 classified references to American
literature prepared by this bureau, as follows:

Literature of—	
1906	10
1907	19
1908	192
1909	195
1910	348
1911	1,358
1912	3,511
1913	8,394
1914	12,386
Total	26,413

The object of the catalogue is not only to publish references by authors to current scientific literature, but also to supply practically a digest of the subject contents of each paper by means of minutely classified subject catalogues. The elaborate classification schedules used render it possible to refer to all subjects treated in each paper indexed.

It is the duty of this Bureau of the International Catalogue to analyze and classify the contents of all scientific papers published in the United States. An idea of the extent of the work may be gained from the fact that between 25,000 and 30,000 citations are sent each year to the London central bureau for publication, the subjects classified covering all branches of science. In this day of specialization it is not possible for one or two individuals to have a thorough knowledge of all the sciences, and as economy of administration would not warrant the employment of, say, a dozen specialists, it was the practice for a number of years to refer some of the more technical papers to specialists for classification. These specialists, being employees of the various scientific branches of the Government in Washington, have, while not engaged in their official duties, aided the catalogue by furnishing the classification data required. Payments averaged approximately $600 per year, divided among five or six individuals. It may be said that while the specialists were willing to aid in this important international undertaking for a comparatively nominal compensation, the catalogue was benefited to a very great extent, for each citation furnished was the equivalent of a specialist's decision as to the value and application of the scientific subject of each paper classified. This method of compensating employees of other scientific bureaus of the Government was decided on in 1905 after a conference between the disbursing agent of the Smithsonian Institution and the then Comptroller of the Treasury.

The present Comptroller of the Treasury does not agree on this subject with the former comptroller, and in a letter dated February 4, 1914, referring to a number of similar payments stated:

> I am of the opinion that the payments in question come within the prohibition of sections 1764 and 1765, Revised Statutes, and were not authorized by law. In view of the fact that this office, in letters dated October 24, 1905 and February 15, 1906, sanctioned the payments to employees of other bureaus and departments, which seems to have been construed to sanction the payments for both classes, no disallowance will be made in the present settlement, but payments made subsequent to the date of this decision will not be allowed.

This decision has greatly embarrassed the work of the bureau, and it is hoped that Congress will so change the wording of future appropriations for the maintenance of the bureau as to authorize payments of this character being made.

ıe general organization of the International Catalogue of Scien- Literature consists of a central bureau in London whose duty to assemble, edit, and publish classified references to current ıtific literature supplied by the various regional bureaus repre- ıng the cooperating countries. The following named countries established regional bureaus, supported in most cases by direct ernment grants: Argentine Republic, Austria, Belgium, Canada, i, Cuba, Denmark, Egypt, Finland, France, Germany, Greece, land, Hungary, India and Ceylon, Italy, Japan, Mexico, New th Wales, New Zealand, Norway, Poland, Portugal, Queensland, sia, South Africa, South Australia, Spain, Straits Settlements, den, Switzerland, United States of America, Victoria and Tas- ia, and Western Australia.

he present war in Europe has seriously interfered not only with finances but with the general work of the catalogue. Before ilities began the receipts and expenditures of the London cen- bureau just balanced. These receipts are derived from the sale he catalogue to the various subscribers throughout the world are used entirely to defray the cost of printing and publishing. ıbscriptions aggregating almost $6,000 a year, due from five of countries engaged in hostilities, have been either delayed or ped by the war. The Royal Society of London, realizing that ould be impossible for the central bureau to continue publishing catalogue in the face of this deficit, has very generously made ant of a sum almost sufficient to cover the deficit caused by the year of the war. It may be said that the Royal Society has only stood sponsor for the catalogue since its inception, but it through the good offices of this society that the enterprise was un. It is greatly to be hoped that this action of the Royal iety will stimulate similar institutions in the United States to in making up the annual deficit until a readjustment of the ıirs of the bureaus affected can be made after peace has been lared.

Very respectfully, yours,

LEONARD C. GUNNELL,
Assistant in Charge.

Dr. CHARLES D. WALCOTT,
Secretary of the Smithsonian Institution.

Appendix 8.

REPORT ON THE PUBLICATIONS.

Sir: I have the honor to submit the following report on the publications of the Smithsonian Institution and its branches during the year ending June 30, 1915:

The Institution proper published during the year 14 papers in the series of "Smithsonian Miscellaneous Collections," two annual reports, pamphlet copies of 68 papers from the general appendices of these reports, and 8 special publications. The Bureau of American Ethnology published 2 bulletins and 3 miscellaneous publications, and the United States National Museum issued 1 annual report, 1 volume of the Proceedings, and 41 separate papers forming parts of this and other volumes, 6 bulletins, and 1 volume pertaining to the National Herbarium.

The total number of copies of publications distributed by the Institution proper during the year was 77,710. This number includes 620 volumes and separate memoirs of Smithsonian Contributions to Knowledge, 30,058 volumes and separate pamphlets of Smithsonian Miscellaneous Collections, 30,909 volumes and separate pamphlets of Smithsonian annual reports, 10,185 publications of the Bureau of American Ethnology, 5,424 special publications, 36 volumes of the Annals of the Astrophysical Observatory, 121 reports of the Harriman Alaska Expedition, 245 reports of the American Historical Association, 5 publications of the United States National Museum, and 108 publications not of the Smithsonian or its branches. There were distributed by the National Museum 54,300 copies of its several series of publications, making a total of 132,010 publications distributed by the Institution and its branches during the year.

SMITHSONIAN CONTRIBUTIONS TO KNOWLEDGE.

QUARTO.

No publications of this series were issued during the year.

SMITHSONIAN MISCELLANEOUS COLLECTIONS.

OCTAVO.

Of the Miscellaneous Collections, volume 57, the title-page an
table of contents was published; of volume 62, 1 paper; of volume 6

rs and title-page and table of contents; of volume 64, 1 paper; volume 65, 8 papers; in all, 14 papers, as follows:

Volume 57.

ge and table of contents. July 31, 1914. (Publ. 2270.)

Volume 62.

Report on European aeronautical laboratories. By A. F. Zahm. July 27, 1914. 23 pp., 11 pls. (Publ. 2273.)

Volume 63.

Smithsonian Physical Tables. Sixth revised edition. By F. E. Fowle. November 10, 1914. xxxvi+355 pp. (Publ. 2269.)

Explorations and field-work of the Smithsonian Institution in 1913. November 27, 1914. 88 pp. (Publ. 2275.)

The olfactory sense of insects. By N. E. McIndoo. November 21, 1914. 63 pp. (Publ. 2315.)

Archeology of the lower Mimbres Valley, N. Mex. By J. Walter Fewkes. December 18, 1914. 53 pp., 8 pls. (Publ. 2316.)

ge and table of contents. January 30, 1915. v pp. (Publ. 2320.)

Volume 64.

Cambrian geology and paleontology. III. Pre-Cambrian Algonkian algal flora. By Charles D. Walcott. July 22, 1914. Pp. 77–156, pls. 4–23. (Publ. 2271.)

Volume 65.

The present distribution of the Onychophora, a group of terrestrial invertebrates. By Austin H. Clark. January 4, 1915. 25 pp. (Publ. 2319.)

The development of the lungs of the alligator. By A. M. Reese. March 3, 1915. 11 pp., 9 pls. (Publ. 2356.)

A study of the radiation of the atmosphere. By Anders K. Ångström. Hodgkins fund. 159 pp. (Publ. 2354.) In press.

New evidence on the intensity of the solar radiation outside the atmosphere. By C. G. Abbot, F. E. Fowle, and L. B. Aldrich. Hodgkins fund. June 19, 1915. 55 pp. (Publ. 2361.)

The microspectroscope in mineralogy. By Edgar T. Wherry. April 7, 1915. 16 pp. (Publ. 2362.)

Explorations and field-work of the Smithsonian Institution in 1914. June 30, 1915. 95 pp., 1 pl. (Publ. 2363.)

Two new sedges from the southwestern United States. By Kenneth K. Mackenzie. April 9, 1915. 3 pp. (Publ. 2364.)

Report upon a collection of ferns from western South America. By William R. Maxon. May 3, 1915. 12 pp. (Publ. 2366.)

SMITHSONIAN ANNUAL REPORTS.

Report for 1913.

Annual Report of the Board of Regents for 1913 was received the Public Printer in completed form in December, 1914.

l Report of the Board of Regents of the Smithsonian Institution show- operations, expenditures, and condition of the Institution for the year ng June 30, 1913. xi+804 pp., 169 pls. (Publ. 2277.)

Small editions of the following papers, forming the general appendix of the annual report for 1913, were issued in pamphlet form:

The earth and sun as magnets, by George E. Hale. 14 pp., 8 pls. (Publ. 2278.)

The reaction of the planets upon the sun, by P. Puiseux. 16 pp. (Publ. 2279.)

Recent progress in astrophysics, by C. G. Abbot. 20 pp., 3 pls. (Publ. 2280.)

The earth's magnetism, by L. A. Bauer. 18 pp., 9 pls. (Publ. 2281.)

Modern ideas on the end of the world, by Gustav Jaumann. 9 pp. (Publ. 2282.)

Recent developments in electromagnetism, by Eugene Bloch. 19 pp. (Publ. 2283.)

Wireless transmission of energy, by Elihu Thomson. 18 pp. (Publ. 2284.)

Oil films on water and on mercury, by Henri Devaux. 13 pp., 7 pls. (Publ. 2285.)

Water and volcanic activity, by Arthur L. Day and E. S. Shepherd. 31 pp., 11 pls. (Publ. 2286.)

Ripple marks, by Ch. Epry. 11 pp., 10 pls. (Publ. 2287.)

Notes on the geological history of the walnuts and hickories, by Edward W. Berry. 13 pp. (Publ. 2288.)

The formation of leaf mold, by Frederick V. Coville. 11 pp. (Publ. 2289.)

The development of orchid cultivation and its bearing upon evolutionary theories, by J. Costantin. 14 pp. (Publ. 2290.)

The manufacture of nitrates from the atmosphere, by Ernest Kilburn Scott. 26 pp., 3 pls. (Publ. 2291.)

The geologic history of China and its influence upon the Chinese people, by Eliot Blackwelder. 12 pp., 9 pls. (Publ. 2292.)

The problems of heredity, by E. Apert. 17 pp. (Publ. 2293.)

Habits of fiddler-crabs, by A. S. Pearse. 14 pp. (Publ. 2294.)

The abalones of California, by Charles L. Edwards. 10 pp., 10 pls. (Publ. 2295.)

The value of birds to man, by James Buckland. 20 pp. (Publ. 2296.)

Experiments in feeding hummingbirds during seven summers, by Althea R. Sherman. 10 pp. (Publ. 2297.)

What the American Bird Banding Association has accomplished during 1912, by Howard H. Cleaves. 11 pp., 2 pls. (Publ. 2298.)

The whale fisheries of the world, by Charles Rabot. 9 pp., 3 pls. (Publ. 2299.)

The most ancient skeletal remains of man, by Aleš Hrdlička. 62 pp., 41 pls. (Publ. 2300.)

The redistribution of mankind, by H. N. Dickson. 17 pp. (Publ. 2301.)

The earliest forms of human habitation, and their relation to the general development of civilization, by M. Hoernes. 8 pp. (Publ. 2302.)

Feudalism in Persia; its origin, development, and present condition, by Jacques de Morgan. 28 pp. (Publ. 2303.)

Shintoism and its significance, by K. Kanokogi. 9 pp. (Publ. 2304.)

The Minoan and Mycenaean element in Hellenic life, by A. J. Evans. 21 pp., 3 pls. (Publ. 2305.)

Flameless combustion, by Carleton Ellis. 14 pp., 1 pl. (Publ. 2306.)

Problems in smoke, fume, and dust abatement, by F. G. Cottrell. 33 pp., 37 pls. (Publ. 2307.)

Twenty years' progress in marine construction, by Alexander Gracie. 21 pp. (Publ. 2308.)

Creating a subterranean river and supplying a metropolis with mountain water, by J. Bernard Walker and A. Russell Bond. 14 pp., 11 pls. (Publ. 2309.)

plication of the physiology of color vision in modern art, by Henry G. r and J. J. R. Macleod. 17 pp. (Publ. 2310.)

entals of housing reform, by James Ford. 14 pp. (Publ. 2311.)

nomic and social rôle of fashion, by Pierre Clerget. 11 pp. (Publ.)

rk of J. van't Hoff, by G. Bruni. 23 pp. (Publ. 2313.)

Report for 1914.

report of the executive committee and proceedings of the of Regents of the Institution, as well as the report of the ary, for the fiscal year ending June 30, 1914, both forming f the Annual Report of the Board of Regents to Congress, ublished in pamphlet form in December, 1914, as follows:

of the executive committee and proceedings of the Board of Regents for ear ending June 30, 1914. 17 pp. (Publ. 2318.)

of the Secretary of the Smithsonian Institution for the year ending 30, 1914. iii, 117 pp., 4 pls. (Publ. 2317.)

ll editions of the following papers, forming the general appen- the report, were issued in June, and the complete volume was d from the printer shortly after the close of the fiscal year:

liation of the sun. By C. G. Abbot. 16 pp., 4 pls. (Publ. 2322.)

theories of the sun. By Jean Bosler. 8 pp., 2 pls. (Publ. 2323.)

m and constitution of the earth. By Louis B. Stewart. 14 pp. (Publ.)

emarks on logarithms apropos to their tercentenary. By M. d'Ocagne. , 2 pls. (Publ. 2325.)

views on the constitution of the atom. By A. S. Eve. 9 pp. (Publ.)

ts and gyrostatic action. By Andrew Gray. 16 pp., 10 pls. (Publ.)

y of aeroplanes. By Orville Wright. 8 pp. (Publ. 2328.)

st man-carrying aeroplane capable of sustained free flight—Langley's ss as a pioneer in aviation. By A. F. Zahm. 6 pp., 8 pls. (Publ. 2329.)

spects of industrial chemistry. By L. H. Baekeland. 25 pp. (Publ.)

ves. By Edward P. O'Hern. 27 pp., 7 pls. (Publ. 2331.)

s of geologic time. By Charles Schuchert. 35 pp. (Publ. 2332.)

oic haloes. By J. Joly. 15 pp., 3 pls. (Publ. 2333.)

logy of the bottom of the seas. By L. de Launay. 24 pp. (Publ. 2334.)

oceanographic researches. By Ch. Gravier. 10 pp. (Publ. 2335.)

ondike and Yukon goldfield in 1913. By H. M. Cadell. 20 pp., 6 pls. l. 2336.)

story of the discovery of sexuality in plants. By Duncan S. Johnson. . (Publ. 2337.)

ns and progress in plant pathology. By L. R. Jones. 13 pp. (Publ.)

autographs and their revelations. By Jagadis Chunder Bose. 23 pp. l. 2339.)

ational Zoological Park and its inhabitants. By Frank Baker. 34 pp., ls. (Publ. 2340.)

On the habits and behavior of the herring gull. By R. M. Strong. 31 pp., 10 pls. (Publ. 2341.)

Notes on some effects of extreme drought in Waterberg, South Africa. By Eugène N. Marais. 12 pp. (Publ. 2342.)

Homœotic regeneration of the antennæ in a Phasmid or walking-stick. By H. O. Schmit-Jensen. 14 pp., 2 pls. (Publ. 2343.)

Latent life: Its nature and its relations to certain theories of contemporary biology. By Paul Becquerel. 15 pp. (Publ. 2344.)

The early inhabitants of western Asia. By Felix V. Luschan. 25 pp., 12 pls. (Publ. 2345.)

Excavations at Abydos. By Edouard Naville. 7 pp., 3 pls. (Publ. 2346.)

An examination of Chinese bronzes. By John C. Ferguson. 6 pp., 14 pls. (Publ. 2347.)

The rôle of depopulation, deforestation, and malaria in the decadence of certain nations. By Felix Regnault. 5 pp. (Publ. 2348.)

The story of the chin. By Louis Robinson. 11 pp., 12 pls. (Publ. 2349.)

Recent developments in the art of illumination. By Preston S. Millar. 18 pp., 3 pls. (Publ. 2350.)

The loom and spindle: Past, present, and future. By Luther Hooper. 49 pp., 11 pls. (Publ. 2351.)

The demonstration play school of 1913. By Clark W. Hetherington. 29 pp. (Publ. 2352.)

Sketch of the life of Eduard Suess (1831–1914). By Pierre Termier. 10 pp. (Publ. 2353.)

SPECIAL PUBLICATIONS.

The following special publications were issued in octavo form:

Publications of the Smithsonian Institution issued between January 1 and June 30, 1914. Published August 8, 1914. 2 pp. (Publ. 2274.)

Publications of the Smithsonian Institution issued between January 1 and September 30, 1914. October 7, 1914. 2 pp. (Publ. 2314.)

Publications of the Smithsonian Institution issued between January 1 and December 31, 1914. January 23, 1915. 3 pp. (Publ. 2355.)

Publications of the Smithsonian Institution issued between January 1 and March 31, 1915. April 17, 1915. 1 p. (Publ. 2365.)

Biographical sketch of James Smithson. October 30, 1914. 17 pp., 4 pls. (Publ. 2276.)

Opinions rendered by the International Commission on Zoological Nomenclature, Opinion 66. March 3, 1915. Pp. 171–176. (Publ. 2359.)

An index to the Museum Boltenianum. By William H. Dall. March 29, 1915. 64 pp. (Publ. 2360.)

PUBLICATIONS OF THE UNITED STATES NATIONAL MUSEUM.

The publications of the National Museum are: (*a*) The annual report to Congress; (*b*) the Proceedings of the United States National Museum; and (*c*) the Bulletin of the United States National Museum, which includes the contributions from the United States National Herbarium. The editorship of these publications is vested in Dr. Marcus Benjamin.

During the year the Museum published an annual report, one volume of the Proceedings and 41 separate papers forming parts of s and other volumes, 6 bulletins, and one volume of Contributions m the National Herbarium.

The issues of the proceedings were as follows: Volume 47, papers 52 to 2063, and the complete volume; volume 48, papers 2064 to 91; volume 49, paper 2093; Annual Report of the United States tional Museum for 1914.

The bulletins were as follows:

lletin 71, A monograph of the Foraminifera of the North Pacific Ocean, Part V, Rotaliidae. By Joseph Augustine Cushman.

lletin 82, A monograph of the existing Crinoids, Vol. 1, The Comatulids, Part 1. By Austin Hobart Clark.

lletin 88, Revision of Paleozoic Stelleroidea, with special reference to North American Asteroidea. By Charles Schuchert.

lletin 89, Osteology of the Armored Dinosauria in the United States National Museum, with special reference to the genus Stegosaurus. By Charles Whitney Gilmore.

lletin 90, A monograph of the molluscan fauna of the Orthaulax Pugnax Zone of the Oligocene of Tampa, Florida. By William Healey Dall.

ecial Bulletin, American hydroids, Part III, The Campanularidae and the Bonneviellidae. By Charles Cleveland Nutting.

In the series of Contributions from the National Herbarium there peared volume 19, Flora of New Mexico, by E. O. Wooten and aul C. Standley.

PUBLICATIONS OF THE BUREAU OF AMERICAN ETHNOLOGY.

The publications of the bureau are discussed in Appendix 2 of e Secretary's report. The editorial work of the bureau has been ntinued by Mr. J. G. Gurley, editor, who has been assisted from me to time by Mrs. Frances S. Nichols.

Two bulletins and three miscellaneous publications were issued durg the year, as follows:

lletin 46. Byington's Choctaw Dictionary. Edited by John R. Swanton and Henry S. Halbert.

lletin 58. List of publications of the bureau.

. 10. Circular of information regarding Indian popular names.

. 11. Map of linguistic families of American Indians north of Mexico.

. 12. List of Indian words denoting "man," prepared in placard form for use in the Smithsonian exhibit at the Panama-Pacific Exposition.

Four annual reports and five bulletins were in press at the close the year.

PUBLICATIONS OF THE AMERICAN HISTORICAL ASSOCIATION.

The annual reports of the American Historical Association are ansmitted by the association to the Secretary of the Smithsonian stitution and are communicated to Congress under the provisions the act of incorporation of the association.

The annual report for 1912 was published in August, 1914. In September, 1914, the manuscript of the 1913 report was sent to the printer, but it was not completed at the close of the year.

PUBLICATIONS OF THE SOCIETY OF THE DAUGHTERS OF THE AMERICAN REVOLUTION.

The manuscript of the Seventeenth Annual Report of the National Society of the Daughters of the American Revolution for the year ending October 11, 1914, was communicated to Congress March 3, 1915.

THE SMITHSONIAN ADVISORY COMMITTEE ON PRINTING AND PUBLICATION.

The editor has continued to serve as secretary of the Smithsonian advisory committee on printing and publication. To this committee have been referred the manuscripts proposed for publication by the various branches of the Institution, as well as those offered for printing in the Smithsonian series. The committee also considered forms of routine, blanks, and various matters pertaining to printing and publication. Eighteen meetings were held and 109 manuscripts were acted upon.

Respectfully submitted.

A. Howard Clark, *Editor.*

Dr. Charles D. Walcott,
Secretary of the Smithsonian Institution.

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Secretary of the Smithsonian Institution.

REPORT OF THE SECRETARY OF THE SMITHSONIAN INSTITUTION

FOR THE YEAR ENDING JUNE 30

1916

(Publication 2431)

WASHINGTON
GOVERNMENT PRINTING OFFICE
1916

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REPORT

OF THE

SECRETARY OF THE SMITHSONIAN INSTITUTION

CHARLES D. WALCOTT

FOR THE YEAR ENDING JUNE 30, 1916.

To the Board of Regents of the Smithsonian Institution:

GENTLEMEN: I have the honor to submit herewith the customary annual report on the operations of the Smithsonian Institution and its branches during the fiscal year ending June 30, 1916, including work placed by Congress under the direction of the Board of Regents in the United States National Museum, the Bureau of American Ethnology, the International Exchanges, the National Zoological Park, the Astrophysical Observatory, and the United States Bureau of the International Catalogue of Scientific Literature.

The general report reviews the affairs of the Institution proper and briefly summarizes the operations of its several branches, while the appendices contain detailed reports by the assistant secretary and others directly in charge of various activities. The reports on operations of the National Museum and the Bureau of American Ethnology will also be published as independent volumes.

THE SMITHSONIAN INSTITUTION.

THE ESTABLISHMENT.

The Smithsonian Institution was created an establishment by act of Congress approved August 10, 1846. Its statutory members are the President of the United States, the Vice President, the Chief Justice, and the heads of the executive departments.

THE BOARD OF REGENTS.

The Board of Regents, which is charged with the administration of the Institution, consists of the Vice President and the Chief Justice of the United States as ex officio members, three Members of the Senate, three Members of the House of Representatives, and six citizens, "two of whom shall be residents in the city of Washington and the other four shall be inhabitants of some State, but no two of them from the same State."

In regard to the personnel of the board the only change during the fiscal year was the appointment of James T. Lloyd, Representative from Missouri. The roll of Regents on June 30, 1916, was as follows: Edward D. White, Chief Justice of the United States, Chancellor; Thomas R. Marshall, Vice President of the United States; Henry Cabot Lodge, Member of the Senate; William J. Stone, Member of the Senate; Henry French Hollis, Member of the Senate; Scott Ferris, Member of the House of Representatives; Ernest W. Roberts, Member of the House of Representatives; James T. Lloyd, Member of the House of Representatives; Andrew D. White, citizen of New York; Alexander Graham Bell, citizen of Washington, D. C.; George Gray, citizen of Delaware; Charles F. Choate, jr., citizen of Massachusetts; John B. Henderson, jr., citizen of Washington, D. C.; and Charles W. Fairbanks, citizen of Indiana.

The board held its annual meeting on December 9, 1915. The proceedings of that meeting, as also the annual financial report of the executive committee, have been printed, as usual, for the use of the Regents, while such important matters acted upon as are of public interest are reviewed under appropriate heads in the present report of the Secretary. A detailed statement of disbursements from Government appropriations, under the direction of the Institution for the maintenance of the National Museum, the National Zoological Park, and other branches, will be submitted to Congress by the Secretary in the usual manner in compliance with the law.

FINANCES.

The permanent fund of the Institution and the sources from which it was derived are as follows:

Deposited in the Treasury of the United States.

Bequest of James Smithson, 1846		$515, 169.00
Residuary legacy of James Smithson, 1867		26, 210.63
Deposit of savings of income, 1867		108, 620.37
Bequest of James Hamilton, 1875	$1, 000	
Accumulated interest on Hamilton fund, 1895	1, 000	
		2, 000.00
Bequest of Simeon Habel, 1880		500.00
Deposits from proceeds of sale of bonds, 1881		51, 500.00
Gift of Thomas G. Hodgkins, 1891		200, 000.00
Part of residuary legacy of Thomas G. Hodgkins, 1894		8, 000.00
Deposit from savings of income, 1903		25, 000.00
Residuary legacy of Thomas G. Hodgkins, 1907		7, 918.69
Deposit from savings of income, 1913		636.94
Part of bequest of William Jones Rhees, 1913		251.95
Deposit of proceeds from sale of real estate (gift of Robert Stanton Avery), 1913		9, 692.42
Bequest of Addison T. Reid, 1914		4, 795.91
Deposit of savings from income, Avery bequest, 1914		204.09

osit of savings from income, Avery fund, 1915	$1,862.60
osit of savings from income, Reid fund, 1915	426.04
osit of balance of principal, $248.05, and income, $28.39, Rhees ind, 1915	276.44
osit of first payment of Lucy T. and George W. Poore fund, 15	24,534.92
osit of part of principal of Addison T. Reid fund, 1916	4,698.59
osit of principal of George H. Sanford fund, 1916	1,020.00
osit of savings from income, 1916	2,681.41
Total of fund deposited in the United States Treasury	996,000.00

Other resources.

istered and guaranteed 4 per cent bonds of the West Shore ailroad Co., part of legacy of Thomas G. Hodgkins (par ilue)	42,000.00
pon 5 per cent bonds of the Brooklyn Rapid Transit Co., due uly 1, 1918 (cost)	5,040.63
pon 6 per cent bonds of the Argentine Nation, due Dec. 15, 917 (cost)	5,093.75
Total permanent fund	1,048,134.38

Ihe second installment to the Addison T. Reid fund, amounting $4,698.59, and a bequest to be known as the George H. Sanford nd, amounting to $1,020, were added during the year to the pernent fund deposited in the Treasury of the United States, which, gether with incomes of several specific funds amounting to ,681.41, now aggregates the total sum of $996,000, which bears terest at the rate of 6 per cent per annum.

The sum of $10,000, being a part of the bequest designated as the ances Lea Chamberlain fund, the income of which is to be applied the maintenance of the Isaac Lea collection of gems and mollusks the National collections, was received by the Institution in tober, 1915, and on the advice of the executive committee was insted in gold notes maturing on December 15, 1917, and July 1, 18. These investments form a nucelus of what will hereafter be own as the consolidated fund. The income account of each specific nd will be credited with the proportion of income which each insted fund bears to the whole fund.

The income of the Institution during the year, amounting to 07,670.26, was derived as follows: Interest on the permanent undation, $60,751.23; contributions from various sources for specific urposes, $22,954.99; first payment of the Frances Lea Chamberlain ind, $10,000; second payment on account of the Addison T. Reid nd, $4,698.59; and from other miscellaneous sources, $9,265.45.

Adding the cash balance of $42,165.86 on July 1, 1915, the total sources for the fiscal year amounted to $149,836.12. The disburseents, which are given in detail in the annual report of the executive committee, amounted to $105,125.10, leaving a balance of $44,711.02 on deposit June 30, 1916, in the United States Treasury and in cash.

The Institution was charged by Congress with the disbursement of the following appropriations for the year ending June 30, 1916:

International exchanges	$32,000
American ethnology	42,000
Astrophysical Observatory	13,000
National Museum:	
Furniture and fixtures	25,000
Heating and lighting	46,000
Preservation of collections	300,000
Books	2,000
Postage	500
Building repairs	15,000
Bookstacks for Government bureau libraries	6,500
National Zoological Park	100,000
International Catalogue of Scientific Literature	7,500
Total	589,500

In addition to the above specific amounts to be disbursed by the Institution there was included under the general appropriation for printing and binding an allotment of $76,200 to cover the cost of printing and binding the Smithsonian annual report, and reports and miscellaneous printing for the Government branches of the Institution.

THE FREER ART GALLERY.

One of the most important events since the foundation of the Institution was consummated in December last. In my last report it was mentioned that Mr. Charles L. Freer was considering the question of erecting a suitable building for the permanent preservation of the splendid collection of objects of art which he presented to the Institution in 1906 and has since augmented by many further gifts. It is exceedingly gratifying here to record the gift by Mr. Freer of $1,000,000 in cash for the immediate erection of a building and that the site and preliminary plans have been agreed upon, so that the actual construction work will soon begin. The building will be of granite and located at the southwest corner of the Smithsonian reservation at Twelfth and B Streets.

The munificent donation by Mr. Freer of his collection and provision for its preservation is unsurpassed in this country, and is one of the most notable gifts of its character in the world's history.

Mr. Freer describes his collection as follows:

> These several collections include specimens of very widely separated periods of artistic development, beginning before the birth of Christ and ending to-day. No attempt has been made to secure specimens from unsympathetic sources, my collecting having been confined to American and Asiatic schools. My great

been to unite modern work with masterpieces of certain periods of zation harmonious in spiritual and physical suggestion, having the roaden esthetic culture and the grace to elevate the human mind.

iginal collection consisted of about 2,300 paintings and other f art, and has since been increased to 5,346 items, including ı paintings and sculptures, the Whistler collection, and paintings, pottery, bronzes, and jades from China, Korea, ıd other Asiatic countries.

catalogue of items is given by Mr. Rathbun in his Museum on the National Gallery of Art.

EXPLORATIONS AND RESEARCHES.

ıual activities were continued during the past year in ad- ›ne of the fundamental objects of the Smithsonian Institu- *increase of knowledge.* In this work various explorations rches were inaugurated or participated in by the Institution ranches, covering practically all divisions of astronomical, logical, biological, and geological science. The extent of lorations and researches during the history of the Institu- rs a wide range, although a great deal more of most impor- k could have been accomplished had adequate funds been Friends of the Institution have generously aided this rticularly during the last few years, through the contribu- nds for specific purposes, but much yet remains undone, and ities for undertaking important lines of investigation are y being lost through lack of means to carry them into

proposed expeditions to various parts of the world have porarily delayed by the war in Europe.

ıere mention only briefly some of the recent activities of the n in these directions and for details of other investigations r to the appendices containing the reports of those directly of the several branches of the Institution.

EOLOGICAL EXPLORATIONS IN THE ROCKY MOUNTAINS.

inuation of my previous work in the Rocky Mountain re- as engaged during the season of 1915 in field investigation ellowstone Park area and from there north into the Belt s east of Helena, Mont. The work in the Yellowstone Park ed on with two objects in view:

To determine, if possible, the extent to which the lower forms ınd possibly bacteria contributed, through their activities, position from the geyser and hot spring waters of the con- rbonate of lime and silica.

Second. The securing for the National Museum of a series of geyser and hot spring deposits, also silicified wood from the petrified forests and certain types of volcanic rocks.

During the investigation and collecting, numerous photographs were taken of geysers and hot springs and of deposits made from the waters through evaporation and organic agencies.

The collections were brought to the camps by pack horses and buckboard and subsequently packed for shipment at Fort Yellowstone and Yellowstone. Material assistance was afforded by the cooperation of the acting superintendent of the park, Col. L. M. Brett, United States Army, and officers of the United States Engineer Corps in charge of the maintenance and development of the park roads and trails.

Upward of 5 tons of specimens were collected and shipped to the National Museum. This collection permits of the preparation of a special Yellowstone Park exhibit of great beauty and interest.

It was found that algal growth was everywhere present when the temperature of the waters was from 70° to not much above 180° F., and that this growth had a marked effect upon the amount and character of both calcareous and siliceous deposits.

After completing the investigation of the geyser and hot spring deposits, a trip was made to the Fossil Forest in the northeastern section of the park, in the Lamar River Valley. Large collections were made here of silicified wood and various minerals, one of the latter being a remarkable and beautiful form of calcite rosettes, which were illustrated and technically described in the pamphlet on Smithsonian explorations in 1915.[1]

The camp site in the Lamar Valley was one of unusual interest and beauty. The high hills to the south showed the rock cliffs containing silicified woods, calcite rosettes, and beautiful specimens of chalcedony. A little way from the camp the party met with a large herd of bison grazing freely in the broad open valley; also herds of elk, bands of antelope, a few black bear, and an occasional wolf.

On leaving the park, after 675 miles of travel with the camp outfit, the party proceeded down the West Gallatin River Canyon, stopping to examine the section of Cambrian rocks at the mouth of Squaw Creek. The next permanent camp was made in Deep Creek Canyon, 17 miles east of Townsend, Mont., where the extensive pre-Cambrian sections of the Big Belt Mountains are beautifully shown. About 2 tons of pre-Cambrian specimens were collected in this vicinity before the storms of late September (1915) closed the season's field work.

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[1] Smithsonian Miscellaneous Collections, Vol. 66, No. 3, 1916.

MASTODON FROM INDIANA.

ny finds of mastodon and mammoth remains, especially from ent localities in States bordering on the Great Lakes, are con- ly being reported to the Institution. These “finds,” chiefly in p deposits of the Pleistocene, generally consist of a few isolated s or teeth, but afford evidence of an abundance of these great ures during the geological age just preceding the present. Com- d, however, with the great number of remains found, complete tons are rare, principally because the finds are generally brought ght by workmen who have little or no knowledge of the scien- value of the remains. The National Museum was therefore nate during the past year in the acquisition of a fine, nearly plete adult male mastodon skeleton from a swamp deposit in hwestern Indiana.

part of the skull, four limb bones, a few ribs and vertebræ unearthed by a dredge crew while excavating a drainage canal shipped to the Institution. Mr. J. W. Gidley, of the National eum, later succeeded in finding the lower jaws, most of the re- ing vertebræ and ribs, parts of the pelvis, and a few more limb foot bones, and on a second visit found the missing sections of vertebral column, several more foot bones, and other important ments. On assembling all the bones recovered it has been found , with comparatively little artificial restoration, an unusually fine complete specimen of the American mastodon can be prepared exhibition.

ONTOLOGICAL AND STRATIGRAPHIC STUDIES IN THE PALEOZOIC ROCKS.

r. E. O. Ulrich of the National Museum, was occupied for sev- months during the field season of 1915, under the auspices of United States Geological Survey, in a study of the lower ozoic deposits of the Mississippi Valley. He was engaged fly in seeking evidence respecting the boundary line between the brian and Ozarkian systems. For this purpose many of the rops of these rocks were visited, but the most important evidence found in the upper Mississippi Valley and in the Missouri where Upper Cambrian rocks are particularly well displayed, and the eeding deposits of the Ozarkian system are more commonly iliferous than elsewhere. The relative abundance of fossils in e areas permitted the actual boundary between the two systems e accurately determined after considerable study. This boun- y was found to coincide with the uneven plane formed at the ction of the deposits laid down by the retreating Cambrian sea h those formed by the return of the waters in the succeeding rkian time. During the progress of these stratigraphic studies numerous collections of fossils were secured for the museum series, and incidentally the investigations resulted in the proper placement of many fossils whose stratigraphic position had hitherto been uncertain.

In the latter part of the season Dr. Ulrich worked out the field relations of some insufficiently located collections of Paleozoic fossils made in southwest Virginia at various times in the past. The most important result of these investigations is the proof that a large coral fauna, exceedingly like that which marks the horizon of the Onondaga limestone throughout the extent of this well known and widely distributed Middle Devonian formation, had already invaded the continental basins as far as southwest Virginia during the closing stages of the preceding Lower Devonian. This instance of recurring fossil faunas is regarded as one of the most important of the many similar instances that have been established through the field studies of Dr. Ulrich during the past 25 years. All have served in correcting erroneous correlations of formations that had arisen through the confusion of earlier or later appearances of faunas with the one recognized in the standardized sequence of stratigraphic units.

Mr. R. D. Mesler, under the supervision of Dr. Ulrich, spent the summer of 1915 in making collections of Ordovician and Silurian fossils from formations and localities in the Appalachian and Mississippi Valleys which had hitherto been little represented in the museum collections. A large number of fossils resulted from his trip, particularly from the Middle Ordovician rocks of east Tennessee, which will form the basis of a future monograph on the paleontology of that region.

EXPLORATIONS IN SIBERIA.

Through the liberality of the Telluride Association the Institution was enabled to send Mr. B. Alexander with the Koren Expedition to the Kolyma River region of northern Siberia. The expedition left Seattle, Wash., in June, 1914, and returned in September, 1915. The immediate purpose of the trip was to obtain remains of large extinct animals, particularly of the mammoth for which the region is noted. The results were not all that were hoped for, but a considerable quantity of material was obtained, though no complete skeleton. A report, with photographs taken by the party, was published in the pamphlet on Smithsonian explorations and field work in 1915. The collection of bones sent in by the expedition contains a few fine specimens, together with a considerable number of isolated bones, which are valuable for study and comparison. They all indicate a late Pleistocene age, as the bones of many of the forms represented can with difficulty be distinguished from those of species still living in at region. The animals represented include the mammoth, bison, rabou, horse (two or more species), rhinoceros, musk-ox, wolverine, d wolf. The prize specimen is a finely preserved, almost complete ull of *Elephas primigenius.* It is of especial interest as being the ly skull of the Siberian mammoth in any of our American useums.

COLLECTING FOSSIL ECHINODERMS IN THE OHIO VALLEY.

Explorations for fossil echinoderms were conducted during the ummer of 1915, under the supervision of Mr. Frank Springer, associate in paleontology in the United States National Museum. The ork was limited to two areas of Silurian rocks in the Ohio Valley rom each of which much valuable material was procured for the tudy of certain definite problems. In southern Indiana Mr. Herick E. Wilson, under Mr. Springer's direction, spent a number of weeks quarrying for Niagaran echinoderms, particularly crinoids, in the vicinity of St. Paul where numerous outcrops of the Laurel limestone occur. The object of this work was to secure as many specimens as possible for comparisons of this peculiar fauna with those from European Silurian rocks. Not only was much material obtained by the quarrying operations, but all of the local collections of fossils were purchased for Mr. Springer, so that the Museum, which hitherto had practically no fossils from the Laurel limestone, is now in possession of a splendid general collection of fossils from this particular formation.

The second area of exploration was in west Tennessee along the Tennessee River, where Mr. W. F. Pate spent some weeks in searching for the peculiar crinoidal bulb, Camarocrinus, and the associated crinoid, Scyphocrinus, both of which Mr. Springer has proved to belong to the same organism. Mr. Pate was successful in finding several localities where excellent specimens of the Camarocrinus and Scyphocrinus were associated. Much material was secured and the specimens will be used in the preparation of Mr. Springer's monograph upon this group of crinoids.

GEOLOGICAL WORK IN PENNSYLVANIA AND VIRGINIA.

By arrangement with the United States Geological Survey, Dr. Edgar T. Wherry, of the National Museum, continued his studies of the geology of the Reading quadrangle in eastern Pennsylvania for a month during the summer of 1915. He completed the areal mapping of the Cambrian and Ordovician rocks of the region, and has transmitted to the Survey the manuscript of a report upon his work. He also mapped Cambrian and Triassic formations on the Quakertown and Doylestown quadrangles, which lie to the east of the Reading.

A brief visit was made to a newly discovered cave near Lurich, Va., where the cave marble was reported to be of economic importance. This view proved to be unjustified, but some unusual stalactitic formations were found, two specimens of which were obtained for the Museum collections.

EXPEDITION TO BORNEO AND CELEBES.

As the result of zoological explorations carried on by Mr. H. C. Raven in Celebes, through the generosity of Dr. W. L. Abbott, the Museum has received 464 mammals, 870 birds, 50 reptiles, and some miscellaneous specimens. The mammals and birds are of great value as the first adequate representation of a fauna that has particular interest in connection with previous work in other parts of the Malay Archipelago. Early in the summer of 1915 Mr. Raven returned to America and spent several months on vacation and in preparing for further explorations in Celebes and other parts of the East Indies. Dr. Abbott has offered his continued support to this work. Mr. Raven left Washington for the East by way of Japan and Singapore, about the middle of October. Two months later he reported from Buitenzorg, Java, that he was making good progress toward the collecting ground.

EXPLORATIONS IN CHINA AND MANCHURIA.

Zoological explorations, mentioned in previous reports, have been continued in China and Manchuria by Mr. Sowerby through the generosity of a friend of the Institution who desires to remain unknown. During July, August, and September, he made an expedition to the lower reaches of the Sungari River and the I-mien-po district in north Manchuria, where he succeeded in collecting some interesting specimens of mammals, birds, and fishes to be forwarded to the Institution.

EXPLORATIONS IN EASTERN SIBERIA.

In the summer of 1915 Mr. Copley Amory, jr., returned from the northeast coast of Siberia, where for about a year he had been gathering zoological material in connection with a party under Capt. John Koren. As his part of the results of the expedition Mr. Amory turned over to the National Museum 365 mammals, 264 birds, and various miscellaneous specimens principally of plants, fish, and birds' eggs. Most of this material was prepared by Mr. Amory himself, though various members of the expedition contributed to the collections of both mammals and birds. Among the mammals, about wild species are represented and are of interest for comparing Alaskan species with their nearest Asiatic relatives.

EXPEDITION TO ST. THOMAS, DANISH WEST INDIES.

Ir. C. R. Shoemaker, of the division of marine invertebrates in National Museum, spent the two months from the middle of ie to the middle of August, 1915, in the Danish West Indies, er the auspices of the Carnegie Institution of Washington, D. C., iring collections of corals and other marine invertebrates. This edition has enriched the collections of the National Museum by ut 5,000 specimens, which it is hoped will throw considerable it on the correlation of these islands in the West Indian complex. 'he collecting was done in the open water, bays, and channels at Thomas, St. John, and St. James. The deeper waters were ex- red by means of dredging from a motor boat, while native divers, :king from the heavy West Indian row boats, were used for iecting in the shallow waters. In addition to this, much shore lecting was done. Owing to the very strong and constant trade id, work on exposed reefs was in many cases made impossible by heavy surf. Collecting in the protected bays, however, was most cessful, as a great variety of bottom was to be found in many them.

While the chief aim of the expedition was to secure as complete representation of the coral fauna as possible—and this aim met th considerable success—fine collections of other marine inverte- ates were also obtained, including protozoa, sponges, hydroids, dusæ, alcyonarians, anemones, bryozoans, starfish, sea urchins, holo- urians, annelids, crustaceans, mollusks, and ascidians. Collections re also made on land whenever opportunities offered, including ects, mollusks, reptiles, and batrachians.

CACTUS INVESTIGATIONS IN BRAZIL AND ARGENTINA.

Dr. J. N. Rose, associate in Botany, United States National useum (at present connected with the Carnegie Institution of ashington in the preparation of a monograph of the Cactaceæ of nerica), accompanied by Mr. Paul G. Russell, of the United States tional Museum, continued the botanical exploration of South nerica during the summer of 1915, spending over five months in vel and field work in Brazil and Argentina.

In addition to the good-sized collections of cactuses, consisting of ing, herbarium, and formalin specimens, moderately large collec- ns of insects, shells, diatoms, and other natural-history specimens re obtained. In all about 8,000 herbarium specimens were ob- ned and over 90 cases, large and small, of living plants were sent back to the United States. The living collection is now on exhibition at the New York Botanical Garden.

Bahia, Brazil, was the first place visited, which city served as a base for collecting trips into the interior of the State of Bahia. One of these was to the town of Joazeiro, located about 300 miles north-northwest of Bahia, and lying in a typical cactus desert, although this region is traversed by the large Rio Sao Francisco. Notwithstanding the fact that this stream is full the entire year, little or no attempt is being made to use the water for irrigation purposes. The country is of that type known as "catinga," and resembles in a remarkable way the deserts of the West Indies; indeed, the genera of plants are in many cases the same, though the species are distinct. Here was seen the "carnuba," or wax palm, from which is obtained the wax utilized in making records for phonographs. Near Joazeiro is the Horto Florestal, or "forest garden," a Government experiment station in charge of Dr. Leo Zehntner, who rendered great assistance in the study and collection of the cactuses of the region.

After making short stops at various stations in returning to Bahia, a trip was made to Machado Portella, a small town about 175 miles west and a little south of Bahia, the terminus of a little narrow-gauge railway. This is also a semiarid region and proved exceedingly interesting botanically. The next side trip was to Toca da Onca, still farther south, on the edge of a thick tropical forest and in a region much more humid than the northern part of the State.

About six weeks were then spent in beautiful Rio de Janeiro and vicinity. Here, even in the city itself, a botanist finds a great deal to interest him, for the trees are covered with epiphytic cactuses, mostly of the genus Rhipsalis, and within the city itself rises the picturesque Corcovado, a thickly wooded mountain on whose slopes are found many rare ferns and tree-inhabiting cactuses. The Jardin Botanico in this city is one of the finest in the world. Over 200 species of palms from all parts of the tropics are here grown in the open, besides many other rare tropical plants. In another section of the city, in a fine large park called the Quinta Boa Vista, is the Museo Nacional, where a number of rare cactuses were found in the herbarium.

From Rio de Janeiro an ascent of Itatiaya, the highest mountain in Brazil, was made, and on the very top, 10,000 feet above the sea, was found a small cactus with beautiful rose-colored flowers. Excursions were also made to Cabo Frio, to Ilha Grande, and to the islands in the Bay of Rio de Janeiro. A few days were spent in the Organ Mountains, near Petropolis, the summer home of the wealthiest classes of Rio de Janeiro. This range of mountains merits a more thorough biological exploration than has been hitherto undertaken.

Proceeding southward, a day was spent at Santos, Brazil, the world's greatest coffee center. Buenos Aires was visited next, although but little time was spent in the city. Several visits were made to the fine suburb of La Plata, where resides Dr. Carlos Spegazzini, the leading authority on Argentine cactuses.

From Buenos Aires a trip was taken across Argentina to Mendoza, a city situated near the foot of the Andes, in a region favorable to the growth of succulent plants. From there a short excursion was made to Portrerillos, Argentina, on the railway which leads to Valparaiso, Chile. Many very interesting plants were found in both these places.

In the city of Cordova, Argentina, northwest of Buenos Aires, the cactus collection of Dr. Frederick Kurtz was found to contain some rare types, which were very kindly submitted for examination and study. In this vicinity, as well as in the neighboring town of Cosquin, many cactuses were collected on the semiarid peneplain.

FOG-CLEARING INVESTIGATIONS.

Aided by a grant of $2,000 from the Smithsonian Institution and a grant from the Research Corporation, a committee of electrical engineering experts, under the general direction of Mr. F. G. Cottrell, continued during 1915 the investigations begun at San Francisco by the University of California, in cooperation with the United States Lighthouse Service, relative to the clearing of fog by means of electrical precipitation. In a preliminary report read at the first meeting of the committee, Prof. Ryan, of Stanford University, says:

> Science has established the fact that all dust and fog particles in the open atmosphere are electrified and subject to dispersion or precipitation. It is apparent, therefore, that a source of very high direct voltage, with facilities for control and application, may be of inestimable value in certain quarters and seasons for clearing fog away from a street, from along a passenger railway, from around the landing stages of a ferry, or, possibly, about or in advance of a ship under headway at sea.

The clearing of fog differs from the treatment of smoke and fumes in several respects, principally in that the smoke particles must be actually deposited on the electrodes to bring about the desired effect, whereas in treating fog it is only necessary to cause coalescence of the minute particles into larger ones to give much greater transparency, even disregarding the more rapid settling of the larger drops. However, other difficulties are to be expected in the problem of clearing fog, such as the conditions arising from the continual immersion in the wet atmosphere. What is chiefly needed for an intelligent conception of the problem is actual first-hand experience in handling these and other unusual conditions.

The most striking features of the apparatus used in these experiments are the Thordarson 350,000 to 1,000,000 volt transformers, which I saw while visiting the San Francisco Exposition.

A great deal was learned during the year about the electrical technique of the problem, and although days of suitable fog conditions were extremely scarce, on the rare occasions of actual trial very perceptible clearing for a short distance around the high-tension wires was obtained as the fog swept past.

EXPLORATIONS OF ANCIENT MAYA CITIES IN GUATEMALA AND HONDURAS.

Through the courtesy of the Carnegie Institution of Washington, the Smithsonian Institution has been enabled to participate in some very interesting explorations in Central America. Prof. W. H. Holmes, head curator of anthropology in the National Museum, gives the following general account of his work in that country:

> In February, 1916, owing to a generous grant of funds by the Smithsonian Institution, the writer had the good fortune to become a member of the Car-

negie Institution's archeological expedition to Central America under the able direction of Sylvanus G. Morley. The work of exploring and studying in detail the remarkable remains of the ancient Mayan culture was vigorously carried forward. An especial object of the expedition was the discovery of additional inscriptions embodying glyphic dates, for it is the dates, now read with facility, which furnish the skeleton of Maya history.

Among the ancient cities visited while the writer was associated with the expedition were Antigua, the ancient Spanish capital of the kingdom of Guatemala, built on the site of a prehistoric city; the extensive ruins of the ancient city of Iximache, near the site occupied to-day by the capital of Guatemala, Guatemala City; the ruined city of Quirigua in eastern Guatemala, the subject of much scientific interest during recent years; and the ruins of Copan, in Honduras, perhaps the most remarkable of all the American monuments of antiquity.

Especial attention was given by the writer to the collection of data and drawings to be utilized in preparing panoramic views of the several cities visited, and every effort was made to obtain information regarding the technical methods employed by the ancient builders. The quarries from which the stone was obtained were too deeply buried in tropical vegetation to yield up their story without extensive excavation and the methods employed in dressing and carving the stone remain in large part undetermined. Certain chipped and ground stone implements that could have served in dressing the stones used in building were found in numbers, but the story of the carving, especially of the very deep carving of the monuments of Copan, remains unrevealed. Although it is thought that stone tools may have been equal to the great task, it is believed by some that without bronze the work could not have been done. There are, however, no traces of the use of bronze by the Central Americans.

The monuments are on a grand scale and great skill and excellent taste are manifest in their embellishment, the whole giving evidence of a state of culture advancement unsurpassed in any other part of aboriginal America.

STUDY OF NOCTURNAL RADIATION.

Several grants from the Hodgkins fund have been made to Prof. Anders Ångström during the past few years to enable him to carry on researches on the radiation of the atmosphere, particularly nocturnal radiation. The results of observations made by him in Algeria in 1912 and in California in 1913 were embodied in a pamphlet published by the Institution in 1915. In this pamphlet he summarizes his work as follows:

> The main results and conclusions that will be found in this paper are the following. They relate to the radiation emitted by the atmosphere to a radiating surface at a lower altitude, and to the loss of heat of a surface by radiation toward space and toward the atmosphere at higher altitudes.
>
> I. The variations of the total temperature radiation of the atmosphere are at low altitudes (less than 4,500 m.) principally caused by variations in temperature and humidity.
>
> II. The total radiation received from the atmosphere is very nearly proportional to the fourth power of the temperature at the place of observation.
>
> III. The radiation is dependent on the humidity in such a way that an increase in the water-vapor content of the atmosphere will increase its radiation. The dependence of the radiation on the water content has been expressed by an exponential law.

An increase in the water-vapor pressure will cause a decrease in the ive radiation from the earth to every point of the sky. The fractional ase is much larger for large zenith angles than for small ones.

The total radiation which would be received from a perfectly dry atmos- would be about $0.28\frac{\text{cal.}}{\text{cm.}^2\text{min.}}$ with a temperature of 20° C. at the place of vation.

The radiation of the upper, dry atmosphere would be about 50 per cent it of a black body at the temperature of the place of observation.

. There is no evidence of maxima or minima of atmospheric radiation dur- he night that can not be explained by the influence of temperature and dity conditions.

II. There are indications that the radiation during the daytime is subject e same laws that hold for the radiation during the nighttime.

. An increase in altitude causes a decrease or an increase in the value of ffective radiation of a blackened body toward the sky, dependent upon the of the temperature gradient and of the humidity gradient of the atmos- . At about 3,000 meters altitude of the radiating body the effective radia- generally has a maximum. An increase of the humidity or a decrease of emperature gradient of the atmosphere tends to shift this maximum to r altitudes.

The effect of clouds is very variable. Low and dense cloud banks cut the outgoing effective radiation of a blackened surface to about 0.015 le per cm.² per minute; in the case of high and thin clouds the radiation is ed by only 10 to 20 per cent.

. The effect of haze upon the effective radiation to the sky is almost in- ciable when no clouds or real fog are formed. Observations in Algeria 12 and in California in 1913 show that the great atmospheric disturbance d by the eruption of Mount Katmai in Alaska, in the former year, can only reduced the nocturnal radiation by less than 3.0 per cent.

I. Conclusions are drawn in regard to the radiation from large water sur- , and the probability is indicated that this radiation is almost constant at ent temperatures, and consequently in different latitudes also.

nother grant was made to Prof. Ångström in October, 1915, for a y of nocturnal radiation in the far north during the long tic night. Concerning this study he wrote to the Institution on ruary 16, 1916, as follows:

rough this grant I have been able to make observations on nocturnal ation during the Arctic night in the north of Sweden, at a place named ko, at about 68° 30′ latitude. The observations were extended during t a month (Jan. 1–26) and were obtained under various atmospheric con- ns. One night observations were taken at a temperature of —30° C. 0° F.), when consequently the absolute humidity must have been very low. general, these observations confirm the views expressed in my paper[1] in rd to the influence of temperature and humidity upon the nocturnal radia- and the radiation of the atmosphere.

connection with the named measurements observations were also made on cooling of snow surfaces under the temperature of the surrounding air as a equence of nocturnal radiation. As was to be expected, a linear relation found to exist between the radiation and the named temperature difference.

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[1] Smithsonian Misc. Coll., Vol. 65, No. 3, 1915.

I hope in the near future to get an opportunity to extend these important observations on the connection existing between radiation and the cooling of various materials existing on the earth's surface. The question is one of scientific as well as of practical agricultural interest.

HARRIMAN TRUST FUND.

Dr. C. Hart Merriam, research associate of the Institution, aided by the income of a trust fund established for the purpose by Mrs. E. H. Harriman, has continued his zoological investigations, particularly the study of the big bears of North America.

RESEARCH CORPORATION.

The Research Corporation was established in 1912 under the New York State laws with the Secretary of the Smithsonian Institution as one of the directors and a member of the executive committee. The primary object of the organization was to develop certain patents described in previous reports which had been offered to the Institution by Dr. F. G. Cottrell but which could not be administered directly by the Institution. Other inventions and patents have since been acquired by the corporation, and through royalties from the installation and utilization of these patents a considerable fund has been created and the income therefrom will be devoted to the advancement of technical and scientific investigation and experimentation through the agency of the Smithsonian Institution and such other scientific and educational institutions and societies as may be selected by the directors.

The Cottrell patents relate to the precipitation of dust, smoke, and chemical fumes by the use of electrical currents. Successful commercial installations have already been made on the following fumes:

(*a*) Silver fumes from electrolytic slimes of copper refinery; (*b*) tin fumes from detinning process residues; (*c*) hydrochloric acid fumes from cleaning vats in electrogalvanizing plant; (*d*) tin and zinc fumes from waste metal recovery plant; (*e*) "low-bleach" from electrolytic plant; (*f*) sulphuric acid mist from contact acid plant; (*g*) lead fumes from copper converters; (*h*) fumes from roasting of zinc ores; and (*i*) dust from buffing wheels and from machines for powdering slate.

NATIONAL RESEARCH COUNCIL.

At its annual meeting in Washington in April, 1916, the National Academy of Sciences voted unanimously to offer its services to the President of the United States in the interest of national preparedness, and it was suggested that the academy "might advantageously

anize the scientific resources of educational and research institu-
ns in the interest of national security and welfare." The President
epted the offer and requested the academy to proceed with the
anization. An organizing committee was accordingly appointed,
l on June 19 the council of the academy, acting upon recommenda-
ns of that committee, voted—

> hat there be formed a National Research Council whose purpose shall be to
> ng into cooperation existing governmental, educational, industrial, and other
> arch organizations with the object of encouraging the investigation of
> ural phenomena, the increased use of scientific research in the development
> merican industries, the employment of scientific methods in strengthening
> national defense, and such other applications of science as will promote the
> ional security and welfare.
>
> hat the council be composed of leading American investigators and engineers,
> resenting the Army, Navy, Smithsonian Institution, and various scientific
> eaus of the Government; educational institutions and research endowments;
> the research divisions of industrial and manufacturing establishments.

fter the close of the fiscal year the National Research Council
s fully organized, the President of the United States appointing
representatives of the Government and authorizing the appoint-
nt of other members by the president of the National Academy of
ences.

OFFICERS AND EXECUTIVE COMMITTEE.

hairman, George E. Hale; vice chairmen, Charles D. Walcott and Gano
nn; secretary, Cary T. Hutchinson; executive committee, John J. Carty
airman), William H. Welch (ex officio), George E. Hale (ex officio), Edwin
Conklin, Gano Dunn, Arthur A. Noyes, Raymond Pearl, Michael I. Pupin,
V. Stratton, V. C. Vaughan (others to be appointed).

MEMBERS OF NATIONAL RESEARCH COUNCIL.

r. L. H. Baekeland, Yonkers, N. Y.
r. Marston T. Bogert, professor of organic chemistry, Columbia University.
r. John A. Brashear, Allegheny, Pa.
r. John J. Carty, chief engineer, American Telephone & Telegraph Co.
r. Russell H. Chittenden, director, Sheffield Scientific School, Yale Uni-
sity.
r. Edwin G. Conklin, professor of zoology, Princeton University.
r. John M. Coulter, professor of botany, University of Chicago.
rigadier General William Crozier, Chief of Ordnance, U. S. Army.
r. Gano Dunn, president The J. G. White Engineering Corporation.
r. Simon Flexner, director, Rockefeller Medical Institute.
ajor General William Crawford Gorgas, Surgeon General, U. S. Army.
r. W. F. M. Goss, dean of engineering, University of Illinois.
r. George E. Hale, director, Mount Wilson Solar Observatory.
r. Clemens Herschel, president American Society of Civil Engineers.
rof. William H. Holmes, head curator of anthropology, United States Na-
al Museum.
r. W. W. Keen, president American Philosophical Society.
r. Van H. Manning, Director U. S. Bureau of Mines.
rof. Charles F. Marvin, Chief United States Weather Bureau.

Prof. A. A. Michelson, director, Ryerson Physical Laboratory, University of Chicago.

Dr. Robert A. Millikan, professor of physics, University of Chicago.

Dr. Arthur A. Noyes, director, research laboratory of physical chemistry, Massachusetts Institute of Technology.

Dr. Raymond Pearl, director, Maine Agricultural Experiment Station.

Prof. E. C. Pickering, director, Harvard College Observatory.

Dr. Michael I. Pupin, professor of electro-mechanics, Columbia University.

Mr. Charles F. Rand, president United Engineering Society.

Prof. Theodore W. Richards, director of the Wolcott Gibbs Memorial Laboratory, Harvard University.

Mr. C. E. Skinner, director, research laboratory, Westinghouse Electric & Manufacturing Co.

Lieutenant Colonel George O. Squier, Chief of Aviation, U. S. Army.

Dr. S. W. Stratton, Director U. S. Bureau of Standards.

Mr. Ambrose Swasey, Cleveland, Ohio.

Rear Admiral David W. Taylor, Chief Constructor U. S. Navy.

Dr. Elihu Thomson, Swampscott, Mass.

Dr. C. R. Van Hise, president of the American Association for the Advancement of Science.

Dr. Victor Clarence Vaughan, director, medical research laboratory, University of Michigan.

Dr. Charles D. Walcott, Secretary of the Smithsonian Institution.

Dr. William H. Welch, president of the National Academy of Sciences.

Dr. W. R. Whitney, director of the research laboratory, General Electric Co.

The council will be gradually enlarged by the addition of new members who are to serve as chairmen of important committees or who are otherwise to engage in some special work.

To carry out the work of the council committees are being appointed, including (*a*) committee on rules and procedure; (*b*) committee on publication; (*c*) committee on research in educational institutions to consider general plans for the promotion of research in educational institutions and to arrange for local committees in each institution; (*d*) committee on promotion of industrial research with functions in the field somewhat similar to those of the preceding committee; (*e*) committee on a national census of research to prepare a national census of equipment for research, of the men engaged in it, and of lines of investigation pursued in cooperating Government bureaus, educational institutions, research foundations, and industrial research laboratories. It has also been decided to form joint committees in various branches of science in cooperation with the corresponding national scientific societies.

THE LANGLEY AERODYNAMICAL LABORATORY.

In view of the organization of the National Advisory Committee for Aeronautics, provided for by act of Congress approved March 3, 1915, it has appeared unnecessary at present to proceed further toward the permanent establishment of the proposed Langley labora-

As secretary of the Smithsonian Institution, I was appointed
ıber of the National Advisory Committee and elected chairman
executive committee, and in this connection I have been able
perate toward the solution of many important problems per-
g to the science and art of aviation. One of the chief advan-
already being realized by the establishment of the advisory
ittee is a closer cooperation between the Army and Navy and
Federal departments and coordination of work in the general
cement of aviation. The Institution published during the year
amphlets on aeronautics, one, a series of reports on wind
l experiments, and the other on "Dynamical stability of aero-
s," both of them by J. C. Hunsaker and associates.

PUBLICATIONS.

publications of the Institution proper include three series:
sonian Contributions to Knowledge; Smithsonian Miscellan-
Collections; and Smithsonian Annual Reports. Under the di-
n of the Institution there are also issued the Annual Reports,
edings, and Bulletins of the United States National Museum,
ling the Contributions from the National Herbarium; Annual
ts and Bulletins of the Bureau of American Ethnology; and
nnals of the Astrophysical Observatory. All of these series
t the "Contributions" and "Collections" are printed through
l Congressional allotments. In all of these series there was pub-
during the year a total of 8,498 pages and 623 plates of illus-
ns.

ithsonian Contributions to Knowledge.—This series is intended
w results of original research constituting important contribu-
to knowledge. One memoir of the series was in press at the
of the year giving the results of an extended study on the com-
ive histology of the femur.

ithsonian Miscellaneous Collections.—Twenty-two papers,
ng parts of five volumes of this series, were issued, among them
papers on Cambrian geology by your secretary. In this series
nual exploration pamphlet was issued, giving brief accounts
e explorations and field work of the Institution in geology,
y, and anthropology, covering every continent on the globe,
llustrated by 141 photographs taken in the field by the scien-
hemselves. The Smithsonian Physical Tables, which together
the Mathematical and Geographical Tables have become stand-
orks of reference in educational and research institutions, are
hed in this series. The sixth revised edition of the Physical
s, issued during the preceding year, was quickly exhausted,
g it necessary to print additional copies. Still another edition
in press, indicating the constant demand for this work.

Smithsonian report.—The complete volume of the 1914 report was received from the printer and distributed at the beginning of the year. Material for the 1915 report was sent to press in December, and was completed just before the fiscal year closed. In the general appendix are 22 papers showing recent progress in various branches of science, including "The utilization of solar energy," "Evidences of primitive life," by your secretary, "Heredity," "Linguistic areas in Europe," and "Recent developments in telephony and telegraphy." The custom of printing special editions in pamphlet form of papers in the general appendix has proved of great advantage; in several cases there has been a demand for a very large number of copies, which was especially noticeable in connection with an article on "The value of birds to man" in the 1913 report.

Special publications.—Opinion 67 of the Opinions of the International Commission on Zoological Nomenclature was issued as a special publication. A special paper by Chester G. Gilbert of the National Museum, on "Sources of nitrogen compounds in the United States" attracted considerable attention. Among other conclusions, he states:

> The evolution of a practicable process for the oxidation of by-product ammonia to render present resources available, with the development of an atmospheric nitrogen fixation output by the Cyanamide process carefully timed to meet growing demands following a reduction in the retail price of nitrogenous fertilizer, would appear to be the desirable governmental procedure as being the one least liable to disastrous consequences.

National Museum publications.—The National Museum issued an annual report, 2 volumes of the proceedings, 52 separate papers forming parts of these and other volumes, and 4 bulletins.

Bureau of Ethnology publications.—The Bureau of American Ethnology published 2 annual reports, separates of 4 accompanying papers in these reports, and 2 bulletins.

Reports of historical and patriotic societies.—The annual reports of the American Historical Association and the National Society of the Daughters of the American Revolution were submitted to the Institution and communicated to Congress in accordance with the charters of these organizations.

Allotments for printing.—Most of the allotment to the Institution and its branches for printing was used during the year, though it was impracticable to complete a large amount of material in press at the close of the year in the National Museum and Bureau of American Ethnology series.

The allotments for the year ending June 30, 1917, are as follows:

For the Smithsonian Institution: For printing and binding the annual reports of the Board of Regents, with general appendices, the editions of which shall not exceed 10,000 copies	$10,000

r the annual reports of the National Museum, with general appen- lices, and for printing labels and blanks, and for the Bulletins and roceedings of the National Museum, the editions of which shall not xceed 4,000 copies, and binding, in half morocco or material not more xpensive, scientific books, and pamphlets presented to or acquired y the National Museum library	$37,500
r the annual reports and Bulletins of the Bureau of American Eth- iology and for miscellaneous printing and binding for the bureau	21,000
r miscellaneous printing and binding:	
International Exchanges	200
International Catalogue of Scientific Literature	100
National Zoological Park	200
Astrophysical Observatory	200
r the annual report of the American Historical Association	7,000
Total	76,200

Committee on printing and publication.—All manuscripts submit-
1 for publication by the Institution or its branches have, as usual,
en referred to the Smithsonian advisory committee on printing and
blication. During the year 18 meetings were held and 96 manu-
ripts examined and passed upon. The personnel of the committee
ıs as follows: Dr. Leonhard Stejneger, head curator of biology,
tional Museum, acting chairman; Dr. C. G. Abbot, director of the
strophysical Observatory; Dr. Frank Baker, superintendent of the
tional Zoological Park; Mr. A. Howard Clark, editor of the Smith-
nian Institution, secretary of the committee; Mr. F. W. Hodge,
nologist in charge of the Bureau of American ethnology; and
r. George P. Merrill, head curator of geology, United States
tional Museum.

LIBRARY.

The accumulation of a scientific library has always been an im-
rtant phase of the Institution's work in the "increase and diffusion
knowledge," and the collection has increased in size from year to
ar until at present it numbers well over half a million titles. The
cessions of the year aggregated about 13,000 books and pamphlets.
The main Smithsonian library is assembled in the Library of Con-
ress and is known as the Smithsonian deposit. In addition the
stitution maintains the Smithsonian office library, the National
[useum library, the library of the Bureau of American Ethnology,
ıe Astrophysical Observatory library, and the National Zoological
'ark library, besides some 35 specialized sectional libraries main-
ained in various offices for the use of the scientific staff of the Insti-
ution and its branches. The Smithsonian office library contains a
ollection of books relating to art, the employees' library, and an exten-
ive aeronautical library. This collection of aeronautical works has
een notably increased by additional gifts from Dr. Alexander

Graham Bell, consisting of 33 books and 37 portfolios of periodicals, and by a number of reference works from the library of Major Baden-Powell.

The National Museum library received 4,840 accessions, among them 207 titles contributed by Dr. William Healey Dall to his collection of works relating to mollusks; and the scientific library of Dr. Theodore Nicholas Gill, numbering about 3,000 volumes, presented to the Institution by his brother, Mr. Herbert A. Gill, which is a valuable addition to the natural history series, especially in ichthyology.

INTERNATIONAL CONGRESSES AND EXPOSITIONS.

SECOND PAN AMERICAN SCIENTIFIC CONGRESS.

The Second Pan American Scientific Congress, which held its sessions in Washington from December 27, 1915, to January 8, 1916, was the fifth of a series of scientific congresses, the first three of which included only the Latin American countries. At the first strictly Pan American Congress, held in Peru in 1908, in which the United States was invited to participate, it was unanimously voted to hold the next meeting in Washington. The congress held its inaugural session at 10 a. m., December 27, at Memorial Continental Hall, and business sessions and social affairs were arranged for every day thereafter until January 8. The following are the sections into which the congress was divided:

I. Anthropology.
II. Astronomy, Meteorology, and Seismology.
III. Conservation of Natural Resources, Agriculture, Irrigation, and Forestry.
IV. Education.
V. Engineering.
VI. International Law, Public Law, and Jurisprudence.
VII. Mining and Metallurgy, Economic Geology, and Applied Chemistry.
VIII. Public Health and Medical Science.
IX. Transportation, Commerce, Finance, and Taxation.

At the meetings of these sections a great number of papers of scientific and economic importance were read.

The Institution proper was represented in the congress by your secretary and Prof. W. H. Holmes, head curator of anthropology, United States National Museum, as delegates. Of the branches of the Institution, the Bureau of American Ethnology was represented by the ethnologist in charge, Mr. F. W. Hodge, and Dr. J. W. Fewkes, delegates; and the Astrophysical Observatory by Dr. C. G. Abbot, delegate, and Mr. F. E. Fowle, alternate. A reception was held for the Latin American delegates by the Board of Regents and the Secretary of the Institution in the new building of the National Museum on the evening of December 29.

iis highly successful and important congress was attended by roximately 100 official delegates from the 21 American Republics, 60 by special invitation, or representing societies or universities. United States was represented by approximately 1,000 unofficial gates or members.

NINETEENTH INTERNATIONAL CONGRESS OF AMERICANISTS.

The Nineteenth International Congress of Americanists, which s to have been held at Washington on the invitation of the Smith- ian Institution in October, 1914, was postponed on account of war in Europe until a more favorable time for an international thering. When it became evident that a fully attended meeting uld be out of the question in the near future, it was decided to ld the congress in affiliation with the section of anthropology of Second Pan American Scientific Congress and jointly with the nerican Anthropological Association, the American Folk-Lore ciety, the American Historical Association, and the Archaeologi- l Institute of America. In consequence the date of the meeting s definitely fixed for December 27–31, 1915.

Mr. John W. Foster, ex-Secretary of State, former minister to xico and Russia, ex-president of the Washington Society of the chaeological Institute, etc., served as president of the congress. e honorary presidents were the Secretary of the Smithsonian In- tution; Mr. Clarence B. Moore, of Philadelphia; and Prof. illiam H. Holmes, of the National Museum. Mr. Clarence F. rment, of Washington, served as treasurer, and Dr. Aleš Hrdlička, the National Museum, as secretary of the Congress. There was ong list of honorary vice presidents, a general (honorary) com- ttee, associate foreign secretaries, and an organizing committee ith the Secretary of the Smithsonian Institution as chairman).

Official representatives of foreign Governments were in attendance m Austria, Chile, Cuba, Germany, Great Britain, Greece, Guate- la, Nicaragua, Peru, Russia, Sweden, and Uruguay, and about official delegates from various learned societies and universities the United States and foreign countries.

The headquarters of the congress were at the National Museum, l most of the sessions were held there.

Nearly 100 papers relating to the study of somatology, arche- gy, ethnology, folklore, history, and linguistics were read at the sions of the congress, among them papers by several members of staff of the Bureau of American Ethnology and of the National iseum.

PANAMA-PACIFIC INTERNATIONAL EXPOSITION.

Only a very small allotment was allowed the Smithsonian Institution and its branches from the congressional appropriation for Government exhibits at San Francisco in 1915. It was possible, however, to make a small display showing in a general way the scope and activities of the Institution, and an ethnological exhibit illustrating the characteristics and culture status of typical primitive peoples. The exhibits were located in the Liberal Arts Palace, covering a floor space of about 6,000 square feet.

The exhibit of the Institution proper consisted of a series of photographs of its founder, James Smithson, the four secretaries, pictures of the building and departments, and a complete set of its publications. There was also displayed an exact reproduction of the Langley experimental steam flying machine which performed the epoch-making flights over the Potomac River, May 6, 1896, together with photographs taken at the time. Langley's success as a pioneer in aviation was commemorated on the Column of Progress at the exposition (pl. 1) by a tablet with the following inscription:

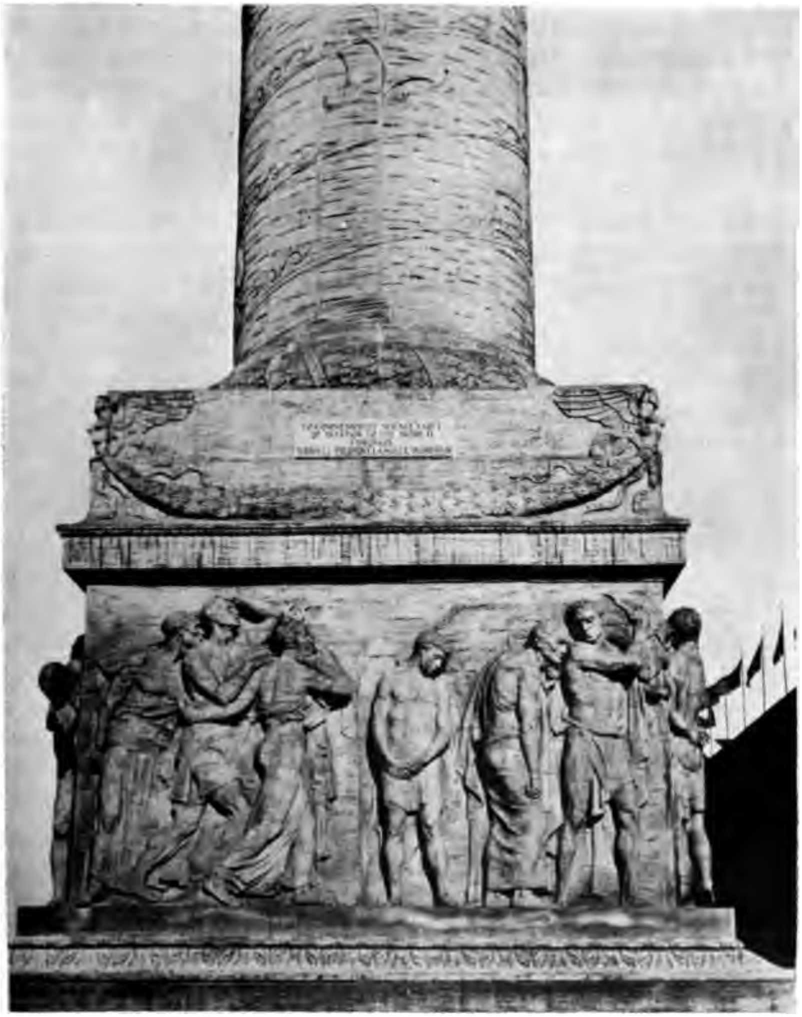
> To commemorate science's gift of aviation to the world through Samuel Pierpont Langley, an American.

The principal exhibit by the National Museum dealt with ethnology, or the scientific study of the races of men, their origin, distribution, relations, and culture. It included four family lay-figure groups, the Eskimo of Alaska, the Dyak of the East Indies, the Zulu-Kaffir of South Africa, and the Carib of South America; also village groups in miniature illustrating the houses and house life of various peoples, together with cases of specimens relating to the primitive arts and industries.

The remaining departments or branches of the Institution, including the International Exchange Service, the Bureau of American Ethnology, the Astrophysical Observatory, the Zoological Park, the Hodgkins fund, the Aerodynamical Laboratory, and the Regional Bureau of the International Catalogue of Scientific Literature, were represented by charts, photographs, maps, instruments, and publications illustrative of their various functions.

Mr. W. de C. Ravenel, administrative assistant of the United States National Museum and secretary to the exposition board, acted as the representative of the Smithsonian Institution and its branches, with the assistance of Dr. Walter Hough, curator of ethnology, United States National Museum.

The exhibits were enumerated in detail in a descriptive catalogue of 120 pages.



LANGLEY TABLET ON COLUMN OF PROGRESS AT PANAMA-PACIFIC INTERNATIONAL EXPOSITION, SAN FRANCISCO, CAL., 1915.

he family groups illustrated the most effective museum method ›resenting ethnological material. The catalogue describes the ıps as follows:

e Eskimo family group comprises seven life-size figures clad in the native ımes and colored according to life, engaged in the usual summer vocations amusements. At the left a woman is cooking meat in a primitive pottery ›l, and another woman is putting dried fish in the storehouse. In the back- nd a man with a sinew-backed bow is watching a youth practicing with his . On the right another man is seated on the ground carving a wooden with a curved knife, and two little girls are playing with their native toys. structure in the back of the case is a representation of the storehouse nonly used by the western Eskimo. The dwelling groups show the houses : dome-shaped, made of earth piled over a cobwork of timbers erected in cavation in the ground. In the summer a passageway gives entrance, but e winter a tunnel is built. A bench on which the people sleep runs around vall on the inside of the house. The cooking within the dwelling is done pottery vessel suspended over a lamp.

e group representing the Zulu-Kaffir and Bantu tribes, which live in the arid southern extremity of the African continent, depicts the natives as ically strong and energetic and not so dark as the true negro. This race is rior in military and social organizations and compares favorably in the and industries with other African families. The group shows a section of use with a doorway, a fireplace on which a woman is cooking mush, a an dipping beer from a large pottery jar, a woman from the field with a a water carrier with a jar on her head, a man playing a marimba or ›hone, and a boy driving a goat. The natives are represented as they ed some years ago, before they were affected by contact with the white Other cases include models of the native African dwellings and examples ıe handiwork of these people, an interesting feature of which is the primi- ironwork in which many African tribes were highly skilled.

ıe next group takes the exposition visitor from Africa across the Atlantic orthern South America, where dwells the Carib in the forested tropical ior of British Guiana. Some of the tribes of this great race have only ıtly been visited by white men. Here is to be seen a Carib warrior with blowgun, a woman and a child squeezing cassava in a primitive lever ı, another woman decorating a tree gourd with characteristic interlocking ;ns, and a child playing with a pet parrot. A hammock swung between two e posts represents the form of bed in general use in ancient as well as ›rn Latin America. Among the articles manufactured by these natives ıples of ceremonial objects and articles of personal adornment are ex- ed, including headdresses, earrings, belts, arm bands, necklaces, and capes.

fourth family group represents the Dyaks of the island of Borneo. They expert house and boat builders and skilled in the use of the blowgun. sago, tropical fruits, monkeys, wild pigs, and other game, yield them stence. The men are warlike, and are still, to some extent, head-hunters, weapons being spears, short swords, and blowguns with poison-tipped ı. The Dyak family group is represented on the porch of a communal ›, carrying on various occupations. A woman is pounding rice in a wooden ar, while another is represented as bringing in a basket of rice on her , a third is making a basket, a man armed with a bayoneted blowgun is ›aching with a freshly killed monkey, and two children are shown playing cradle, a popular native game.

The museum exhibits also included a series of objects illustrating the development of six kinds of implements and appliances of the arts—apparatus for fire making, the jackknife, the saw, the spindle, the shuttle, and the ax. Pictures of other exhibits in biology, geology, and anthropology in the National Museum were shown by a "stereomotorgraph" machine.

The Smithsonian Institution was awarded a grand prize, under the head of scientific investigation, for the collective exhibit by the Institution proper, the Bureau of American Ethnology, the Museum, the Astrophysical Observatory, and the Bureau of International Catalogue of Scientific Literature; a grand prize for the balloon pyrheliometer designed and exhibited by the Astrophysical Observatory; a gold medal for the "Group of elk" shown by the Museum; and a silver medal for investigations for the betterment of social and economic conditions. The balloon pyrheliometer, as its name implies, is an instrument for measuring the heat of the sun. It is carried aloft by a pair of rubber balloons until one of them bursts, when it gradually descends to the earth, supported by the other. Records have thus been obtained at heights of over 9 miles.

PANAMA-CALIFORNIA EXPOSITION AT SAN DIEGO.

Although no appropriation was made by Congress for exhibits at San Diego in 1915, it was possible for the Institution, through cooperation with the exposition authorities, to arrange an interesting exhibit of physical anthropology and one illustrating American aboriginal industries. These exhibits were described in my report of last year.

At the close of the San Francisco Exposition a number of the Smithsonian exhibits were transferred to San Diego, this fair having been extended over another year. These exhibits were located in the Science of Man Building, and included four large cases containing the family groups of natives from different quarters of the globe, as described above, and some cases containing specimens of their arts and industries, together with several small family dwelling groups.

NATIONAL MUSEUM.

The report of Assistant Secretary Rathbun, appended hereto, reviews in detail the operations of the National Museum. The total number of new specimens acquired was 243,733; about one-half pertained to the department of zoology, about one-third were botanical and paleontological, and the rest were additions to the anthropological and other collections. Among the ethnological additions of special interest may be noted a series of costumes, weapons, and utensils from British Guiana; many objects from Celebes,

nd the Philippines; and a large collection from aboriginal
.nd ruin sites in Utah. To the division of American his-
additions included china and glassware and other objects
›roperty of General and Martha Washington. The memor-
en. Sherman, which had long been in the custody of the
have now been presented by his son, Hon. P. Tecumseh
, and the Cromwell collection of 20,000 domestic and for-
age stamps, deposited some years ago, became the absolute
of the Museum on the death of Mr. Cromwell in Septem-

interesting collection of historical costumes there have been
stumed figures representing four hostesses of the White
rs. James Monroe, Mrs. John Quincy Adams, Mrs. Abraham
and Mrs. James R. McKee.

will of Dr. Shepard there was bequeathed an important
of meteorites which had been in the possession of the
for a number of years.

department of biology the additions were representative of
rts of the world, including mammals, birds, and reptiles
ebes and Borneo, collected through the long-continued gen-
f Dr. W. L. Abbott; and like collections from Siam, Kash-
hern China, and Manchuria. Part of the results of the
.ian biological survey of the Panama Canal Zone was a
. of about 18,000 fishes. The Carnegie Institution of Wash-
eposited some 8,000 botanical specimens gathered by Dr.
se in Brazil and Argentina.

ıthbun enumerates many other interesting objects recently
particularly those pertaining to the industrial arts, a depart-
ch has been very greatly developed since the removal of the
istory exhibits to the new building, yet the proper installa-
ries illustrating the many branches of the arts and indus-
lready seriously hindered through lack of space. It is in
rtment in particular that the Museum manifests one of its
functions. The exhibits are so selected and so installed as
visitors how things are made and what they are made of,
o much who makes the best articles or how they should be
› meet the demands of trade. And yet while these collec-
; of all educate the public they also teach the manufacturer
fore are of decided economic importance. One of the lead-
England manufacturers not long since, while examining
bits in his own industrial line, remarked, "this helps

ıot too strongly urge the need of still greater advancement
epartment of Smithsonian activities. The time is fast ap-

proaching when there should be constructed in the Smithsonian reservation another new building, a Museum of Industrial Arts. The collections are here and in many respects they surpass similar collections in Europe or elsewhere. The splendid new building in which the natural history collections are now so adequately housed has offered opportunity for the development of that department beyond the highest expectations. Like progress could be made with a Museum of Industrial Arts. European countries have such structures, one is needed here in Washington. It is an economic question. Commercial museums have their place for developing trade and commerce, and are of much value for such purpose, but the development of the artistic taste of the public through an educational Museum of Industrial Arts is of even greater importance. It would stimulate inventive skill and advance every art and every industry. The exhibits illustrating textile industry and mineral technology in particular are very complete, consisting of specimens of raw materials, machinery used in manufacture, and the finished products.

To the National Gallery of Art there has been added a collection of 82 drawings in pencil, pen, etc., by contemporary French artists, a gift from citizens of France to the people of the United States; also an oil painting of Abraham Lincoln, by Story, the gift of Mrs. E. H. Harriman. The paintings in the National Gallery collection are of much popular interest and of great artistic and intrinsic value, but they are crowded in temporary quarters in a building designed for purposes other than a gallery of art.

During the last year Mr. Freer made 535 additions to his collection, including 23 paintings and sculptures by American artists, and over 500 oriental objects consisting of paintings, pottery, bronzes, and jades. The entire collection now aggregates about 5,346 items.

The auditorium in the new building has been the meeting place of a number of scientific bodies and of international congresses; and in the foyer opportunity was offered for several special exhibitions.

In cooperating with schools and colleges there were distributed some 7,000 duplicate specimens of minerals, fossils, mollusks, and other objects, classified and labeled for teaching purposes.

The number of visitors to the new building averaged 1,012 on week days and 1,240 on Sundays.

BUREAU OF AMERICAN ETHNOLOGY.

The Bureau of American Ethnology is under the direct charge of Mr. F. W. Hodge, whose detailed report is appended hereto. The operations of the bureau include field work and special researches pertaining to the American Indians and the natives of Hawaii.

With the cooperation of the Museum of the American Indian, Heye Foundation, the Nacoochee mound in Georgia was excavated and to have been used both for domicile and for burial purposes. mound were found a large number of smoking pipes and a mount of broken pottery. In New Mexico, also in cooperation e Museum of the American Indian, plans were made for ing the historic pueblo of Hawikuh in the Zuñi Valley south- Zuñi pueblo. Among the most interesting field operations the year were those by Dr. Fewkes in the Mesa Verde al Park, Colo., where he unearthed a type of structure archi- lly different from any hitherto found in the Southwest. The ion was carried on under the joint auspices of the bureau e Department of the Interior, and the building, which Dr. has named the Sun Temple, is described in a pamphlet ed by that department. The Sun Temple is a large D-shaped re, the longest wall of which measures 131 feet 7 inches. The re 2 to 5 feet in thickness and show structural qualities that e favorably with any building of this type north of Mexico. wkes is of the opinion that though the building was used pri- as a place of worship, it was intended also for a place of in case of attack.

he Northwest, investigations were continued by Dr. Frach- on the languages, history, and traditions of the various tribes of Oregon and Washington. In connection with this is interesting to note that in revising some manuscript mate- . Frachtenberg secured the assistance of the last surviving r of the Atfalati tribe of the Kalapuya Indians.

mber of special researches have been in progress during the mong them research work by Dr. Franz Boas in connection e completion of part 2 of the Handbook of American Indian ages. Through the liberality of Mr. Homer E. Sargent, of o, work has been well advanced on an extended study of the dialects, as well as on a study of Salish basketry, which it is d to describe in an illustrated memoir. Part 1 of the Hand- f American Antiquities by Prof. W. H. Holmes was in type close of the year, and the preparation of part 2 was well under

study of Indian music by Miss Frances Densmore, which has ed considerable attention among musicians, has been continued the year, chiefly among the Mandan and Hidatsa Indians in Dakota. A number of ceremonial and war songs were re- phonographically and a new phase of the work was under- consisting of testing the pitch discrimination of the Indians ns of tuning forks. There was in press at the close of the year tin by Miss Densmore entitled "Teton Sioux music."

The publications of the bureau issued during the year comprise two annual reports with their accompanying papers, and two bulletins. In press or in preparation at the close of the year were three annual reports and five bulletins. The bureau library was enriched by the addition of 1,078 volumes, among them 20 volumes of Bibles and portions of the Bible in American Indian languages.

INTERNATIONAL EXCHANGES.

The total number of packages of governmental and other documents handled by the International Exchange Service during the year was 301,625, an increase of 25,869 over the previous year. This figure, however, still shows a decrease as compared with the total handled in 1914, owing to the suspension of shipments to 10 countries involved in the European war. Efforts have been made to resume shipments to certain of these countries, which have met with some degree of success in the case of Germany and Russia.

The Exchange Service has continued its policy of international helpfulness by assisting governmental and scientific establishments to procure publications especially desired both in this country and abroad. One instance showing the value of this policy may be cited. The Pan American division of the American Association for International Conciliation, of New York, wished to assemble a collection of several thousand volumes of North American origin for presentation to the Museo Social Argentino at Buenos Aires. Through the Exchange Service the matter was brought to the attention of the proper establishments and several hundred governmental and other publications were received for the proposed collection.

The number of sets of United States governmental documents sent through the Exchange Service to foreign countries has been reduced from 92 to 91, owing to the discontinuance of shipments to the government of Bombay at the request of that government.

NATIONAL ZOOLOGICAL PARK.

The National Zoological Park is becoming each year a greater and greater attraction to the public, and as its collections increase so does its value become of more importance as a source of information to the zoologist in his study of animal life.

There is now in the park a total of 1,383 individual animals, representing 360 species, as shown by the detailed census in the report of the superintendent.

Among the recent accessions may be mentioned a pair of young lions, a pair of Siberian tigers, a great red kangaroo, several monkeys, and a number of interesting birds, but the newly acquired animal that seems most popular is a male chimpanzee, about 4½ years old, from the forests of French Congo.

The number of visitors during the past year was 1,157,110, as compared with 794,530 in the year preceding. This included 161 schools, classes, etc., numbering 8,679 individuals.

Recent improvements include the construction of a hospital and laboratory building and the grading of some ridges and gullies to secure additional building sites and paddocks for the deer and other large animals.

As mentioned in previous reports an appropriation was made in 1913 for the purchase of several acres as an extension to the western boundary of the park, but legal proceedings and complications incident to adjustment of values and benefit assessments caused such delay that the appropriation, not being a continuing one, lapsed on June 30, 1915, and Congress has failed to renew the allotment for this much desired improvement.

Many important needs are urged by the superintendent, some of which I have mentioned year after year. One of these is an aviary building for the birds now being housed in temporary quarters greatly deleterious to their health. Other needs are a building for the elephants, hippopotami, and similar animals; an ape house; a reptile house; a pheasantry; an ostrich house; an aquarium; and an insectary; also a gatehouse and a permanent boundary fence.

THE ASTROPHYSICAL OBSERVATORY.

Observations of the solar constant were continued at Mount Wilson, Cal., from July to October, 1915, and were begun again in 1916.

During the year there was published the results of solar-constant observations made under Prof. Pickering's direction at Arequipa, Peru, since August, 1912, with a silver-disk pyrheliometer lent by the Smithsonian Institution. These observations confirm the variations of the sun observed at Mount Wilson. An interesting feature of the Arequipa observations was the fact that the volcanic eruption of Mount Katmai in 1912, which produced a great deal of dust over the northern hemisphere, apparently had no effect on the atmosphere south of the equator.

The results of observations at Mount Wilson in 1913 and 1914 on the distribution of radiation along the diameter of the sun's disk were published during the year. It is thus shown that the average distribution over the disk varies from year to year as well as from day to day.

Observations have been continued on the transmission of rays of great wave length through long columns of air, which it is expected will be of much interest in studying the earth's temperature as dependent on radiation toward space.

After several years of experimenting the Astrophysical Observatory has constructed an instrument called the pyranometer, designed for measuring the intensity of sky light by day and of radiation outward toward the sky by night. A full account of this instrument has been published in pamphlet form. The pyranometer may prove of advantage in botanical investigations in forests and greenhouses, since it can measure radiation in deep shade as well as in the full sun.

The Institution has made an allotment from the Hodgkins fund for carrying on solar-constant work at some suitable place in South America. Throughout the year, for several years, it is intended to continue observations at Mount Wilson in California and at the South American station with a view to determine the dependence of the earth's climatic conditions on the sun's variation of radiation. In addition to his solar-constant work the director of the observatory has given considerable attention to experiments at Mount Wilson with solar cooking apparatus "comprising ovens heated by oil under gravity circulation maintained by heat collected by a concave cylindric mirror of about 100 square feet surface." These experiments were not concluded at the close of the year.

INTERNATIONAL CATALOGUE OF SCIENTIFIC LITERATURE.

The International Catalogue of Scientific Literature, the United States bureau of which is administered by the Smithsonian Institution, was organized in 1901, and since that date 17 volumes of references to scientific literature, one for each of 17 branches of science, have been published each year. During the past year 24,160 classified references to American scientific literature were prepared by the United States bureau, bringing the total number of references to the literature of this country since the inception of the catalogue up to 369,509.

As stated in last year's report, the war in Europe caused considerable financial embarrassment to the publication of the catalogue owing to the impossibility of collecting subscriptions from several of the countries involved. The generosity of the Royal Society of London in making up this loss of income made possible the publication of the thirteenth annual issue, and this year a request was made for assistance from the United States. Your secretary succeeded in interesting the Carnegie Corporation, of New York, in the project and through the generous assistance of that establishment it was made possible to publish the fourteenth annual issue.

The value to science of this catalogue is universally recognized, and it is the opinion of scientists everywhere that any lapse in its publication would be a real calamity, as shown by the action of the International Council of the Catalogue in voting to extend the work to at east 1920.

NECROLOGY.

James Burrill Angell, doctor of laws, died April 1, 1916. He had been a regent of the Institution for a quarter of a century, from January 19, 1887, to January 15, 1912, when he resigned on account of age and inability longer to attend meetings of the board. He was born at Scituate, R. I., January 7, 1829, and through his long life as a journalist, an educator, and a diplomat he served his country faithfully in many positions of honor and trust.

He began his career as a professor of modern languages at Brown University, was a journalist during the period of the Civil War, president of the University of Vermont 1866–1871, president of the University of Michigan 1871–1909, United States minister to China 1880–1882, and minister to Turkey 1897–98, and served on several important treaty commissions. In accepting his resignation as a regent in 1912 the board recorded its appreciation of his long and faithful service to the Smithsonian Institution.

Respectfully submitted.

Charles D. Walcott, *Secretary.*

APPENDIX 1.

PORT ON THE UNITED STATES NATIONAL MUSEUM.

IR: I have the honor to submit the following report on the opera-
ns of the United States National Museum for the fiscal year end-
June 30, 1916:

INTRODUCTORY.

Seventy years ago Congress first definitely recognized the national
llections and directed their segregation and preservation under
e custody and supervision of the Smithsonian Institution in the
ilding to be erected for that establishment. By 1850 arrange-
nts had been sufficiently perfected to justify the appointment of an
sistant in charge of museum matters and to begin the acquisition
natural-history specimens, but it was not until 1858 that the
tensive collections which had previously accumulated at the
tent Office could be accepted. With an influx of material rela-
ely as phenomenal as in more recent years, the Museum rapidly
read beyond the boundaries originally assigned to it and by 1875
s practically in possession of all parts of the Smithsonian building
t required for the offices of the parent institution. But even so,
ere was a condition of great congestion from which relief was
ly obtained in 1881, the year of the completion of the second
ilding. Though specially designed for displaying the many im-
rtant donations in numerous branches of the industrial arts from
Centennial Exhibition of 1876, the latter had also to serve for
overflow in natural history, a combination which fully taxed
capacity in less than three years. Then followed nearly three
ades during which about as much material was assembled in
side storage as found lodgement within the two structures.

he problem as regards the departments of natural history was
ved when the new large granite building was made ready for
upancy in 1911, except that it lacked accommodations for the
ision of plants, or National Herbarium. As the depository for the
partment of Agriculture and other establishments conducting
tensive botanical explorations, this branch of the Museum has
out outgrown its provisional quarters in the Smithsonian building,
d its future requirements should not long go unheeded.

The most serious phase of the situation now confronting the Museum, however, results from the wholly inadequate facilities for systematically developing the collections illustrative of the industrial arts. Comprehended under the fundamental act, partly organized in 1880, greatly enriched from the Philadelphia exhibition of 1876, and with a steady growth through all subsequent years, this important department, whose principal aim is popular education on technical lines by means of exhibits visualizing conditions and processes as well as products, is filling to such an extent every foot of available space that the halls present rather the appearance of gross storage than of orderly and classified arrangement. Public sentiment, expressed through many channels, demands better progress than heretofore in carrying out the purposes of this department, but the difficulties in the way are by no means confined to limitations of space, since the more immediate embarrassments arise from an insufficiency of funds for employing the necessary skilled assistants required for working up and preparing the exhibits, which includes the construction of many models.

The department of the fine arts is even more poorly provided for than any of the other Museum branches, as it is occupying borrowed space which is already so crowded as seemingly to forbid further contributions, and while this condition lasts there can be little hope for advancement. There is, however, one bright feature to mention in this connection—the decision to immediately begin the erection of the building for the Charles L. Freer collections of American and oriental art, the plans showing a beautiful granite structure, the completion of which will bring to the Institution much the largest donation it has ever had, one of the most notable gifts of its character in the world's history. Put to no expense for either building or collections, it is hoped that the example set by Mr. Freer will lead to more liberal consideration on the part of the Government of the needs of the National Gallery of Art, for which no appropriations of any kind have ever yet been made.

During the past year many valuable additions were made to the collections generally, new and instructive features were incorporated in the exhibition halls, and a wider public interest was stimulated through an exceptional number of meetings and of special expositions of scientific and art objects held at frequent intervals in the convenient quarters provided for such purposes.

COLLECTIONS.

The total number of specimens acquired during the year was approximately 243,733. Received in 1,525 separate accessions, they were classified and assigned as follows: Department of anthropology, 29,493; zoology, 120,303; botany, 40,631; geology and mineralogy,

,700; paleontology, 48,403; textiles, woods, and other animal and egetable products, 2,304; mineral technology, 280; and the National Gallery of Art, 619. As loans for exhibition, 1,960 articles were also btained, mainly for the Gallery of Art and the divisions of history nd ethnology. Material for examination and report, consisting hiefly of rocks, ores, fossils, and recent animals and plants, was eceived to the extent of 1,036 lots.

Anthropology.—One of the most desirable ethnological additions was a series of costumes, weapons, and utensils—excellent illustrations of the arts and industries of recently discovered tribes in the nterior of British Guiana, collected by Mr. John Ogilvie. The aborigines of Celebes and Borneo were represented by many important objects assembled by Mr. H. C. Raven and presented by Dr. W. L. Abbott; and those of the Philippine Islands by extensive and varied contributions, including weapons, musical instruments, baskets, costumes, etc., received from Mrs. Caroline E. Bates, Mr. E. H. Hammond, and the following officers of the United States Army, namely, Maj. Edgar Russel, Maj. W. T. Johnston, and Capt. J. R. Harris. Baskets, ornaments, and other articles of various Indian tribes of North America, were also given by Mrs. Bates; a number of rare and valuable objects from the Osage Indians were deposited by the Bureau of American Ethnology; interesting examples of art and ethnologica from various parts of the world were presented by Miss Louise Salter Codwise; and costumes and implements from the Blackfeet Indians and the Greenland Eskimo were likewise obtained.

An extensive collection of archeological material from mounds and ruin sites in Utah, resulting from explorations by Mr. Neil M. Judd for the Bureau of Ethnology, is of particular value in aiding to determine the distribution of Pueblo culture toward the north. Other accessions from America consisted mainly of artifacts, including many rare specimens, from several of the States, and of woven fabrics and pottery from Peru. A gift of Old World antiquities from Miss Codwise was composed principally of Egyptian scarabs, necklaces, and figurines, and Palestinian amulets, while a collection of prehistoric stone implements from Great Britain contained some choice specimens.

The division of physical anthropology received many skeletons and skulls, in very complete condition, from Mr. Clarence B. Moore, who obtained them at "The Indian Knoll," on the Green River, Ky.; and a similar collection from Mr. George G. Heye, secured during an exploration of old burial sites in Georgia and Tennessee. Especially noteworthy was an excellent series of skulls and numerous other bones belonging to the period before the advent of the whites, procured in old burial caves in Hawaii by Mr. August Busck.

The more notable accessions in mechanical technology bore upon the subjects of the telephone and firearms. The American Telephone & Telegraph Co. contributed a set of instruments and of loading coils, with examples of line wire and glass insulators, used at the opening of the first telephone line between New York and San Francisco on January 25, 1915, and also a duplicate of the first instrument through which speech was transmitted electrically in Boston in 1875; while Dr. Alexander Graham Bell deposited his diplomas, certificates of award, and announcements of election to scientific societies, an interesting series of documents indicative of the many honors which have been conferred upon him. A gift from Mrs. Bates of much historical value included old military guns of European and American manufacture, pistols and revolvers, a gun made in the Philippine Islands, two very fine bronze swivel cannon, and several Toledo blades and other swords.

Mr. Hugo Worch added three old American pianos to his munificent donation of the previous year, and made a provisional deposit of four other instruments, three American and one of London make. The permanent acquisitions in ceramics consisted mainly of examples from some of the prominent potteries of the United States, but among the loans were specimens of porcelains from abroad and also of glassware, bronze, and brass, which are now exhibited in the ceramic gallery.

Among the accessions in graphic arts were experimental apparatus and pictures illustrating progress and the several steps in the electrical transmission of photographs from one place to another, as also the development of the engraving machine called the akrograph; a Wells printing press; examples of the art of overlay in printing; samples of poster stamps and lithographs; and a number of fourteenth and fifteenth century manuscripts. The additions in photography included daguerreotypes, ambrotypes, and tintypes; a sepia print of a painting on carved wood by Rosselimo; and a series of prints of astronomical subjects from the Yerkes Observatory.

American history.—The historical collections were increased to an exceptional extent by both gifts and deposits. Most prominent was a loan by Mr. Walter G. Peter, a descendant of Martha Washington, of many objects of artistic and domestic interest once the property of General and Mrs. Washington at Mount Vernon, which richly supplement the Lewis collection long in the possession of the Museum. Mention can here be made of only a few of the articles, among which were a china portrait plaque of Washington designed by Richard Champion; a water-color portrait of him by William Thornton; two gold lockets containing locks of his hair; a gold watch of Mrs. Washington, the cover engraved with the Washington coat of arms; a child's French dressing table of exquisite workman-p presented by Lafayette to the granddaughter of Mrs. Washing- ı, Martha Custis, who became Mrs. Thomas Peter; letters written Mrs. Washington on the death of her husband; documents relat- g to the settlement of her estate; and a number of fine examples eighteenth century china and glassware.

It is pleasing to note that the valuable loan collection of memorials Gen. William Tecumseh Sherman, United States Army, with me additions, was given into the permanent keeping of the Museum iring the year by his son, Hon. P. Tecumseh Sherman. From the idow and children of Maj. Gen. Henry W. Lawton, United States olunteers, there was acquired as a gift an extensive series of objects, ıcluding a medal of honor from Congress, forming a significant minder of the distinguished career of this officer in the Civil War, veral Indian wars, and the Philippines. Important relics of Capt. dward Trenchard, United States Navy (1784–1824), and of his son, ear Admiral Stephen Decatur Trenchard, United States Navy, ncluding two presents awarded to the former by acts of Congress, ere received on deposit. There were also many other gifts and oans of notable personal and period relics, and the national societies f the Colonial Dames of America and the Daughters of the Ameri- an Revolution made interesting additions to their already extensive an collections.

By the death of Mr. David W. Cromwell, of New York, on Sep- mber 11, 1915, the splendid collection of nearly 20,000 domestic d foreign postage stamps, which he placed on permanent deposit 1908, became the absolute property of the Museum. Among other ditions in philately, including stamps, stamped envelopes, and post rds, were 1,565 new foreign and 269 new domestic issues, received om the Post Office Department.

The collection of historical costumes was enriched to the extent of 2 articles, nearly all of which were loans. To the series of cos- med figures representing hostesses of the White House four were dded, namely, Mrs. James Monroe, Mrs. John Quincy Adams, Mrs. braham Lincoln, and Mrs. James R. McKee.

Biology.—In the accessions of vertebrate animals the Asiatic gion was especially well represented, and many genera and species ew to the collection were obtained. The name of Dr. W. L. Abbott emains conspicuous in this connection through three contributions. he first, composed of material gathered under his direction and at is expense in Celebes and Borneo by Mr. H. C. Raven, consisted of 65 mammals, 869 birds, and a number of reptiles and batrachians. he second, presented jointly with Mr. C. B. Kloss, contained 197 ammals and 133 birds besides reptiles and batrachians from Siam; hile the third was a series of 183 mammals from Kashmir, British ndia. The Celebes and Siam specimens are especially important, both as coming from localities not hitherto represented in the Museum and as supplementing the existing large collections from the related faunal regions of the Malay Peninsula, the Philippine Islands, and Borneo. From northern China and Manchuria was received a valuable series of mammals, birds, and reptiles, the results of further field work by Mr. Arthur de C. Sowerby. Obtained by Mr. Copley Amory, jr., during a collecting trip to the little-known Kolyma River region of northeastern Siberia and presented by him, were 365 mammals and 243 birds, besides a number of nests and eggs of the latter.

Additional mammals were received from Baluchistan through exchange with the McMahon Museum at Quetta and from East Africa as a gift from Mr. Elton Clark. The most important accessions of reptiles, batrachians, and fishes consisted of the specimens obtained in connection with the Smithsonian biological survey of the Canal Zone by Mr. S. F. Hildebrand, Prof. S. E. Meek, and Mr. E. A. Goldman, the number of fishes amounting to about 18,000. An extensive collection of Peruvian fishes made by Dr. R. E. Coker in 1907 and 1908 was presented by the Government of Peru, and another from South American localities was received from Indiana University in exchange. The Bureau of Fisheries deposited 1,242 specimens from *Albatross* explorations in the Pacific Ocean.

The receipts by the division of marine invertebrates were exceptionally extensive. Twenty-seven separate collections were transferred by the Bureau of Fisheries, a part of which had been worked up and described. They represented investigations by the steamer *Albatross* in the Pacific Ocean, by the steamers *Fish Hawk* and *Bache* and the schooner *Grampus* in the Atlantic Ocean and contiguous waters, and certain other inquiries. Of crustaceans there were about 15,000 specimens, of annelids about 1,000 specimens, of pteropod mollusks about 3,200 specimens, of starfishes nearly 150 types, and of fresh-water mollusks about 1,000 specimens from the Mississippi River, besides very many unassorted lots of crustaceans, salpa, pyrosoma, and other groups.

A very large number of miscellaneous invertebrates from the Danish West Indies and about 5,000 specimens of land and marine mollusks from the Florida Keys were deposited by the Carnegie Institution of Washington, while over 3,000 miscellaneous specimens from dredgings off the coast of Florida and about 7,000 land and fresh-water shells from Cuba were presented by Mr. John B. Henderson. An accumulation of samples of ocean bottom, filling nearly 11,000 bottles, obtained by vessels of the Coast and Geodetic Survey during hydrographic investigations in the Atlantic and Pacific Oceans and the Gulf of Mexico, were transferred to the custody of the Museum.

The principal accessions of insects consisted of Lepidoptera and iptera deposited by the Bureau of Entomology, of named species f beetles and Hymenoptera from Australia, and of types of new pecies presented by Prof. T. D. A. Cockerell.

The division of plants received several large and important colections. The Department of Agriculture transferred over 6,600 pecimens, of which a considerable proportion were grasses. Some ,000 specimens, representing the field work of Dr. J. N. Rose in onnection with his cactus investigations in Brazil and Argentina luring the summer of 1915, were deposited by the Carnegie Institution f Washington; and about 2,000 specimens secured by the Peruvian expedition of 1914–15 were presented by the National Geographic Society and Yale University. Among other important accessions were specimens from the Philippines, Amboina, China, and Panama.

Geology.—During explorations in the Rocky Mountain region in the summer of 1915, Dr. Charles D. Walcott procured for the Museum in the Yellowstone National Park a large and well-selected series of the siliceous and calcareous sinters, including some masses of exceptional size, native sulphur, silicified wood, sundry mineral specimens, nd an extensive representation of volcanic rocks, intended in part for an exhibition of the geological features of that park. Among ther important acquisitions were illustrations of the geology and mineral associations of the pegmatite deposits of southern California, nd of the emerald mines at Muzo, Colombia; a number of scheelite pecimens of more than ordinary interest from Utah; and an unusully fine large specimen of secondary copper sulphate from the Silver Bow Mine, Mont. The Geological Survey transferred examples f the nitrate deposits in Idaho and Oregon, and of potash-bearing salts and associated rocks from the vicinity of Tonopah, Nev.; and Dr. Joseph P. Iddings presented some fine specimens of the peculiar problematic bodies known as obsidianites and Darwin glass from Borneo and Tasmania, and an important series of phosphate rocks from Ocean and Makatea Islands.

By the will of Dr. Charles Upham Shepard, who died early in July, 1915, the very important collection of meteorites belonging to him, which has been on deposit for a number of years, was bequeathed to the Museum; while from several other sources material representing 32 distinct falls of meteorites in many different parts of the world was also acquired.

The mineral collection received many additions, including exceptionally fine specimens, examples of recent finds and several rare species, the largest accession, a deposit from the Geological Survey, consisting of about 300 specimens mostly illustrative of a report by Dr. W. T. Schaller on the gem minerals of the pegmatites of California. From the same Survey was also transferred a large amount of petrological material, mainly rocks illustrating the geology and ore deposits of several districts and localities, described in recent papers.

Of fossil invertebrates the Geological Survey made extensive contributions from the Tertiary of the Atlantic and Gulf coastal plain, the Cretaceous of New Mexico, and other formations and localities. Other important accessions were several thousand specimens of bryozoa and ostracoda from various parts of the world, a collection of Upper Cretaceous forms of special interest as containing types described long ago by Prof. T. A. Conrad, insects from the Florissant beds of Colorado, and types of new species of crabs.

Most prominent of the additions in vertebrate paleontology was a nearly complete skeleton of a large mastodon found near Winamac, Ind., which has already been mounted and placed in the exhibition hall. From the Koren expedition to the Kolyma River region of northeastern Siberia were received nearly 200 specimens, of which the most valuable is a fine skull of the Siberian mammoth, the only one of this northern form now in any American museum. Two collections of fossil plants, recently described, including the type and figured specimens, were transferred by the Geological Survey. One was from the San Juan Basin, N. Mex., the other from the Fox Hills formation, Colo.

Textiles.—In the division of textiles excellent progress was made in the acquisition and installation of new exhibits. Probably the most important was an extensive series of specimens, and of models, sections, and photographs of machinery from the American Thread Co., showing the manufacture of cotton thread in all its details. Other noteworthy accessions were two additional Jacquard machines for decorating textiles; further illustrations of the operation and work of the embroidery automats, of the manufacture of silk fabrics, and of the designing, weaving, and printing of silk upholstery and drapery materials; examples of Javanese batik work on cotton and silk, and of various patterns of moiré silks; a demonstration of the successive stages in the production of painted cut velvet, called "Yuzen Birodo" by the Japanese; and samples of silk skein-dyeing and silk piece-dyeing and printing.

The Japanese Commission to the Panama-Pacific International Exposition contributed 100 commercial fabrics, including many kinds not produced in this country. The representation of American upholstery and drapery fabrics and allied textiles of various materials and character of decoration was greatly increased and improved, and manufacturers continued to keep the collection supplied with novelties and new types and designs of dress fabrics as soon as they were brought out. Numerous excellent examples of the handicraft work done in the schools of the Philippine Islands were also obtained.

Wood technology.—In the recently organized section of wood
hnology there were many accessions of samples of important com-
rcial woods and of illustrations of wood utilization, the public
tallation of which was about to be taken up at the close of the
ar. While the wood specimens, mostly in the form of large boards,
re intended primarily for practical educational purposes, a large
oportion had been determined botanically, insuring for them a
oper technical designation.

The principal collection of wood samples, from the Philippine
ands, consisted of 110 pieces, representing 85 species, the dupli-
tes showing different characteristics as to grain and figure. In
dition there were 16 pieces and 15 species from Argentina; 32
ecimens of various foreign woods highly prized for veneers and
r cabinet and furniture work, including the several important
rieties which are imported into this country under the trade name
mahogany; 38 specimens of redwood from the Pacific coast, repre-
nting a large range of patterns produced by the manufacturers and
me of their better grades of plain lumber; and also examples of
a and ohia woods from Hawaii, Honduran mahogany, red gum,
llow poplar, white oak, and black cherry.

Material received as part of an exhibit of the turpentine industry
luded three butt sections of longleaf pine from a commercial tur-
ntine orchard, illustrating the manner in which gum for the dis-
lation of turpentine is obtained by the box, the cup and gutter, and
e Forest Service methods, clearly showing the progressive improve-
nt from the former wasteful to the modern economical processes.
ese were accompanied by samples of the gum, scrape, turpentine,
d resin, and examples of the tools used, and, in addition, there
s a model of a turpentine still of a pattern common to the long-
f pine belt, in a setting typical of the region, some of the trees
ing boxed and others provided with cups and gutters. The utiliza-
n of wood was also illustrated by samples of dyewoods in the
g, and a series of extracts from them, including logwood, Brazil
od, fustic, and quebracho; and by several series of specimens
owing the materials and successive stages in the manufacture of a
mber of articles of common use, such as matches, tool handles,
ushes, and sporting goods.

Of subjects other than textiles and woods, while no special efforts
re made in their behalf, much desirable material was received, in-
ding agricultural products generally, foods, medicines, resins,
dels of fishing methods and boats, fishery products, etc.

Mineral technology.—A very realistic model of Trinidad Asphalt
ke and its environs, a series of colored transparencies and photo-
aphic enlargements, and a complement of specimens typifying the

different forms of asphalt occurrence as well as the useful products prepared therefrom, constituted the most striking addition to the exhibits in the division of mineral technology. Next may be mentioned a complete ore stope removed bodily, ore faces, timbering, chute, manway, and all accessories, from the Copper Queen Mine at Bisbee, Ariz.

Among other important acquisitions were a model representing the layout of a Portland cement plant and the sequence of operations connected with the manufacture of cement; an industrial series of specimens covering the occurrence and uses of natural graphite, including a remarkable block of pure graphite weighing 250 pounds; a model reproducing the unique method of mining placer gravel for gold in the frozen north by a system of underground drifting or tunneling bedrock, with the ground thawed out in immediate advance of the tunnel by means of steam; and a model of a cyanide leaching plant showing admirably the method commonly employed in the extraction of gold from its ores where the metal does not lend itself to simpler and more direct processes for its segregation.

NATIONAL GALLERY OF ART.

It is very gratifying to note that early in the year Mr. Charles L. Freer waived the condition attending his munificent gift of American and oriental art to the effect that the collection remain in his possession during his life, and expressed a desire that the erection of the building be taken up at the earliest possible moment. The sum required for this purpose, $1,000,000, also a donation from Mr. Freer, was turned over to the Institution in December, and the site and preliminary plans, both satisfactory to the benefactor, received later the approval of the Board of Regents of the Institution, and of the Federal Commission of Fine Arts. The site is the southwestern part of the Smithsonian reservation, at the corner of Twelfth and B Streets, S. W., and approximately two years will be required for the completion of the building, at the end of which time the transfer of the many precious objects to Washington may be expected to take place. The fact that the planning and the execution of the work of construction is in the hands of Mr. Charles A. Platt, of New York, insures their being carried out in an eminently satisfactory manner.

Since the last report Mr. Freer has increased the extent of his collection to about 5,346 items by 535 additions, of which 23 are paintings and sculptures by the American artists Tryon, Thayer, Metcalf, Murphy, and Saint-Gaudens; while the oriental objects, numbering 512, consist mainly of paintings, pottery, bronzes, and jades from China, Korea, and Japan. Mr. Freer announces considerable headway in the preparation of the final catalogues, on which a number of experts of wide repute are at work.

The National Gallery of Art also received during the year from he Department of State a most interesting collection of 82 drawngs in pencil, pen, charcoal, chalk, crayon, and water color, executed y eminent contemporary French artists and presented to the people f the United States by the citizens of the French Republic as a token f their appreciation of the sympathetic efforts of American citizens oward relieving the distress occasioned by the European war. There hould likewise be mentioned an oil portrait of Abraham Lincoln, by eorge H. Story, presented by Mrs. E. H. Harriman.

MEETINGS AND CONGRESSES.

The auditorium and committee rooms in the new building were tilized to a much greater extent than in any previous year for cientific and art meetings, lectures, and other functions. Three of he local societies made the Museum their regular meeting place, mong these being the Washington Society of the Fine Arts, which resented its customary three courses of lectures. Annual or special eetings were held by the National Academy of Sciences, the Mining nd Metallurgical Society of America, the Society of American Foresters, the American Oriental Society, and the American Surgical Association. Lectures, singly or in short series, were given under the auspices of 10 of the science and art societies, and 6 receptions were held in connection with large gatherings of national and international bodies.

Among the special meetings there were several which merit distinctive mention. The most important of these was the Nineteenth International Congress of Americanists which met from December 27 to 31, in affiliation with Section I of the Second Pan American Scientific Congress, then also in session in Washington, the American Anthropological Association, the American Folk-Lore Society, the American Historical Association, and the Archaeological Institute of America. On the afternoon of February 9 a bronze tablet in memory of Prof. S. F. Baird as the instigator of the Federal fishery service, a contribution to the Bureau of Fisheries by 47 subscribers, was dedicated in the auditorium with appropriate ceremonies in the presence of a large assemblage.

During the week of the safety-first exhibition, February 21-28, the auditorium was occupied on five days for lectures and discourses on the subjects comprehended by this notable display, nearly all of them being profusely illustrated, both motion pictures and lantern slides being used. The speakers, besides the Secretary of Labor and several assistant secretaries of departments, were all experts in the several bureaus represented. The exercises attending the centenary celebration of the organization of the Coast and Geodetic Survey, held in the auditorium on April 5 and 6, consisted of an exposition of the work of this, the first scientific service of the Government, by eminent authorities who had been invited to speak upon those phases of the Survey's activities with which they are best acquainted.

The American Association of Museums held its eleventh annual meeting in Washington from May 15 to 18, and the American Federation of Arts its seventh annual convention from the 17th to the 19th of the same month. While only one session of the former and none of the latter was held in the Museum, a reception was tendered to both on the evening of May 17, when an important loan exhibition of the industrial arts was opened with a special view.

SPECIAL EXHIBITIONS.

The educational efforts of the Museum were most notably served by several large and important special exhibitions. Supplementing the arrangements for the meetings of the Congress of Americanists and affiliated societies during convocation week, an interesting installation was made of material relating to pertinent subjects.

During the week of February 21–27 the foyer, with three of its communicating rooms, was occupied by one of the most remarkable and interesting Government exhibitions that has ever been assembled. Having as its theme the "safety-first" idea, it was participated in by 20 bureaus, the American National Red Cross Society, and the Metropolitan police department, the activities of all of which are primarily for or comprehend in a marked degree the safeguarding of life and property, as well as the prevention and care of disease. Although the available area was restricted the display proved most effective and satisfactory, as it was also comprehensive, probably nothing in the Government service relating to "safety first" having escaped some representation. Attention was widely called to the exhibition in advance. The governors of States were notified of the nation-wide aspect of the exposition, one of the results of which was to bring about a meeting of State mine inspectors in the Museum, and manufacturers and operators from all over the country were invited to be present. The total attendance of visitors during the week was 35,447.

The exercises commemorating the centenary of the Coast and Geodetic Survey, held on April 5 and 6, were supplemented by an exhibition in the foyer, the purpose of which was to illustrate the appliances and methods used and the results obtained in both its marine and geodetic work during the 100 years of its existence. The material was admirably selected and arranged, constituting one of the most complete and instructive special displays ever installed in the Museum.

The models and drawings submitted in competition for the monu-ent at Fort McHenry, Baltimore, in memory of Francis Scott Key, thor of the "Star-Spangled Banner," and the soldiers and sailors ho participated in the battle of North Point and the attack on ort McHenry in the War of 1812, were arranged in the rotunda the new building, where, after having been passed upon by the ry of awards, they were exhibited to the public from May 17 to une 17.

The exhibition of American industrial art, held during the spring nd summer of 1915 under the auspices of the American Federation f Arts, was repeated as a feature of the seventh convention of this ssociation, being opened on May 17, 1916, and continuing for one onth. The foyer and five of its communicating rooms were occu-ied. The exposition was designed to bring together examples of rt on industrial lines, both hand and machine made, to show what is eing produced in this country, and though not exhaustive in any articular, some of the best-known art workers of the country par-icipated, and it was felt that a fairly high standard had been aintained.

Following the close of the Panama-Pacific International Exposi-ion on December 4, and in accordance with an act of Congress, a rge part of the Museum's ethnological exhibit was transferred from an Francisco to the Panama-California International Exposition t San Diego, to be shown there until the end of the calendar year 916. The selection made for this purpose consisted of four large amily groups of Eskimo, Zulu-Kaffirs, Caribs, and Dyaks; miniature welling groups of aboriginal peoples in many parts of the world; our cases of artifacts; and a set of lithographs from Catlin's North merican Indian paintings.

MISCELLANEOUS.

Duplicate material to the extent of over 7,000 specimens, classified and labeled for teaching purposes and arranged in 96 sets, was distributed to schools and colleges, the subjects principally represented being rocks, minerals, ores, fossils, and recent mollusks. For obtaining additions to the collections through the medium of exchange, about 9,400 duplicates, chiefly from the natural-history divisions, were utilized. A large number of specimens were sent for study to collaborators of the Museum and other specialists. They consisted mainly of plants, recent animals, and fossils, and were contained in 114 lots.

The attendance of visitors at the new building aggregated 316,707 for week days and 64,521 for Sundays, being a daily average of 1,012 for the former and of 1,240 for the latter. For the older Museum building, which is only open on week days, the total was 146,956 and the daily average 469. The halls in the Smithsonian building, which were closed for renovation during about five months, received 48,517 visitors.

The publications of the year comprised 2 volumes of Proceedings and 4 Bulletins, besides the annual report and 52 separate papers belonging to the series of Proceedings and Contributions from the National Herbarium. The total distribution of Museum publications aggregated 73,798 copies.

Through the addition of 1,895 volumes, 72 parts of volumes, and 2,873 pamphlets, the number of volumes in the Museum library was increased to 47,713, and of pamphlets and unbound papers to 79,241.

Respectfully submitted,

RICHARD RATHBUN,
Assistant Secretary in Charge,
United States National Museum.

DR. CHARLES D. WALCOTT,
Secretary of the Smithsonian Institution.

OCTOBER 30, 1916.

APPENDIX 2.

ORT ON THE BUREAU OF AMERICAN ETHNOLOGY.

: I have the honor to submit the following report on the opera-
of the Bureau of American Ethnology during the fiscal year
l June 30, 1916, conducted in accordance with the provision of
ct of Congress approved March 3, 1915, making appropriations
e sundry civil expenses of the Government, and with a plan of
tions submitted by the ethnologist in charge and approved by
ecretary of the Smithsonian Institution. The provision of the
thorizing the researches of the bureau is as follows:

> rican ethnology: For continuing ethnological researches among the Amer-
> ndians and the natives of Hawaii, including the excavation and preserva-
> f archæologic remains, under the direction of the Smithsonian Institution,
> ing necessary employees and the purchase of necessary books and periodi-
> 42,000.

. F. W. Hodge, ethnologist in charge, devoted most of his ener-
as usual, to administrative affairs. However, in pursuance of a
for cooperative archeological research by the Bureau of Amer-
Ethnology and the Museum of the American Indian (Heye
dation) of New York, Mr. Hodge early in July joined Mr.
ge G. Heye, of the museum mentioned, in the excavation of the
ochee mound in White County, northeastern Georgia, permis-
to investigate which was accorded by the owner, Dr. L. G.
lman.

e Nacoochee mound is an earthwork occupied by the Cherokee
ns until early in the nineteenth century. The name "Nacoo-
" however, is not of Cherokee origin; at least, it is not identifi-
by the Cherokee as belonging to their language, and by no means
the word signify "the evening star" in any Indian tongue, as
riter has claimed.

e summit of the mound, which had been leveled for cultivation
t 30 years ago, measured 83 feet in maximum and about 67 feet
inimum diameter; the height of the mound above the adjacent
was 17 feet 3 inches, and the circumference of the base 410 feet.
e measurements are doubtless less than they were at the time
mound was abandoned by the Cherokee, as all the dimensions

have been more or less reduced by cultivation, the slope at the base particularly having been plowed away for several feet. The mound was reared both for domicile and for cemetery purposes and was composed of rich alluvial soil from the surrounding field. Excavation determined that the mound was not built at one time, but evidently at different periods, as circumstances demanded. This was shown plainly by the stratification of the mound soil, the occurrence of graves at different depths with undisturbed earth above them, the presence of fire pits or of evidences of fires throughout the mound at varying levels, and by the finding of a few objects derived from the white man in the upper part and in the slopes of the mound, but not in the lower levels. From this last observation it is evident that the occupancy of the mound extended well into the historical period, a fact supported by the memory of the grandparents of present residents of the Nacoochee Valley, who recalled the mound when the Cherokee Indians still occupied it and the surrounding area.

The fact that the mound was used for burial purposes is attested by the finding of the remains of 75 individuals during the course of the excavations, the graves occurring from slightly beneath the summit to a depth of about 19 feet, or below the original base of the mound. These graves, with few exceptions, were unmarked, and in most instances were not accompanied with objects of ceremony or utility. The exceptions were those remains with which were buried stone implements, shells or shell ornaments, a smoking pipe, a pottery vessel, or the like. The skeletons were found usually with the head pointed in an eastwardly direction, and were all so greatly decomposed that it was impossible to preserve any of them for measurement and study, the bones in most cases consisting of only a pasty mass.

As mentioned above, most of the burials were unmarked. The exceptions consisted of two graves incased and covered with slabs of stone, both unearthed near the very base of the mound. One of these stone graves contained a skeleton the bones of which were largely of the consistency of corn meal, owing to the ravages of insects, but what was lacking in the remains themselves was more than compensated by the finding near the skull of a beautiful effigy vase of painted pottery, the only piece of painted ware, whole or fragmentary, found in the entire mound. The occurrence of this type of vessel and the presence of the stone graves at the bottom of the mound suggest the possible original occupancy of the site by Indians other than the Cherokee.

Perhaps the most remarkable feature of the mound was the large number of smoking pipes of pottery, mostly broken, but in many forms and of varying degrees of workmanship. Some of the pipes are of excellent texture and are highly ornamented with convenonalized figures of birds, etc., or marked with incised designs. An-her feature of the mound was the presence of a great amount of roken pottery, especially in the refuse at the base and covering the lopes. This pottery is chiefly of fine texture, although some of the ooking vessels are of coarse ware. With the exception of the ainted vessel above noted, the only ornamentation applied by the nakers of the pottery consists of incised and impressed designs, the atter made usually with a paddle of clay or wood, or worked out n the moist ware before firing by means of a pointed tool, a spatula, piece of cane, or a shell.

In pursuance of another plan of cooperative archeological research, Mr. Hodge, in October, visited Zuñi, N. Mex., with Mr. Heye, for the purpose of examining the ruins of the historic pueblo of Hawikuh, in the Zuñi Valley southwest of Zuñi pueblo, and of making the necessary arrangements with the Indians for its excavation. This site is of great archeological and historical interest, as the pueblo was inhabited when first seen by Fray Marcos de Niza in 1539, and when visited and stormed by Coronado in the following year. It became the site of an important Franciscan mission in 1629, and was finally abandoned in 1670 on account of depredations by hostile Indians. By reason of the fact that Hawikuh was inhabited continuously from prehistoric times until 130 years after the opening of the historical period, it is expected that a thorough study of its ruins will shed important information on the effect of the earliest Spanish contact with the Zuñi people and will supplement archeological work conducted in other village sites of that tribe. Owing to unforeseen circumstances, active work was not commenced before the close of the fiscal year, but it is hoped that its initiation will not be long delayed. A permit therefor has been granted by the Secretary of the Interior.

By provisional agreement with the School of American Archæology at Santa Fe, N. Mex., and the Royal Ontario Museum of Archæology at Toronto, plans were perfected whereby the Smithsonian Institution, in conjunction with those establishments, was to conduct archeological researches of an intensive character in the Chaco Canyon of northern New Mexico, one of the most important culture areas north of Mexico. Although every effort was made to obtain from Congress the necessary appropriation for meeting the Institution's share of the expense (a permit for the excavations having been issued by the Secretary of the Interior), the project was presented too late for action, hence the work, so far as the Smithsonian Institution is concerned, has been necessarily postponed.

As opportunity offered, the preparation of the bibliography of the Pueblo Indians was continued by Mr. Hodge, who also represented the Smithsonian Institution as a member of the United States Geographic Board, and the Bureau of American Ethnology at the meetings of the Smithsonian advisory committee on printing and publication.

Dr. J. Walter Fewkes, ethnologist, having been detailed to continue the excavation and repair of prehistoric ruins in the Mesa Verde National Park, Colo., under the joint auspices of this Bureau and the Department of the Interior, left Washington for that locality in August, 1915, and remained in the park continuously until the close of October. Dr. Fewkes devoted his attention mainly to a large mound of stones and earth situated near the point of a promontory opposite Cliff Palace, across Cliff Canyon, the excavation of which revealed a type of structure hitherto unknown in the Mesa Verde National Park, and architecturally different from any that had been previously excavated in the Southwest. The rooms of this building, which Dr. Fewkes designates as "Sun Temple," were thoroughly cleared out, the débris removed, and the walls were repaired in such manner that they will not be likely to deteriorate for many years. A report on the work of excavation and on the structural features of this interesting building forms the subject of an illustrated pamphlet published by the Department of the Interior in June, 1916, under the title "Excavation and repair of Sun Temple, Mesa Verde National Park."

Structurally the Sun Temple consists of two parts—an original building, to which an annex is so united as to give the two a D-shape ground plan, the southern or straight wall of which extends almost exactly east-west. This wall measures 131 feet 7 inches in length; the highest wall of the structure is 11 feet 7 inches, the lowest 5 feet. The walls are massive, varying in thickness from 2 to 5 feet, and are composed of a core of rubble faced on both sides, the exposed stones having been carefully fashioned by hand and accurately fitted, although, as in the case of pueblo masonry generally, the stones are usually neither "broken" at the joints nor bonded at the corners. Nevertheless the walls of the Sun Temple display excellent structural qualities that will compare favorably with any of its class north of Mexico. Architectually the annex resembles certain tower-like structures in the ancient pueblo region, and in plan the whole ruin bears resemblance also to Pueblo Bonito in Chaco Canyon, N. Mex.

The building contains three circular rooms resembling kivas, or ceremonial chambers, still used by some of the Pueblo Indians, and many other rooms of unusual shape and doubtful significance. There was no indication that the Sun Temple had been roofed; indeed, there is strong evidence that the construction of the buildings was never finished. Dr. Fewkes was not able to determine the age of the Sun Temple, but he is of the opinion that it was built later

n Cliff Palace. One evidence of its antiquity, however, was
erved, namely, a cedar tree growing from the top of the highest
ls was found to have 360 annual rings of growth, indicating that
sprouted a few years after Coronado led his expedition into the
thwest in 1540.

The builders of the Sun Temple are supposed by Dr. Fewkes to
ve been the former cliff dwellers of the neighboring canyons.
to its purpose, he is of the opinion that the building was used pri-
rily for worship, but that like other temples among primitive
oples it was intended secondarily as a place of refuge in case of
ack, and for the storage of provisions. The impression of a fossil
lm leaf on the corner stone at the southwestern angle is believed to
rk a shrine where rites to the sky or sun god were performed long
fore the temple was built. It is this supposed shrine that sug-
sted the name for the edifice.

On the completion of the excavation and repair of the Sun Temple,
r. Fewkes similarly treated Oak-tree House, a cliff dwelling in the
ecipice of Fewkes Canyon above which stands the Sun Temple.
collection of artifacts found in this dwelling was gathered in the
urse of the excavation and later deposited in the National Museum.

En route to Washington, Dr. Fewkes visited the so-called "Buried
ity of the Panhandle," on Wolf Creek in Ochiltree County, Tex.,
hich had been reported to the bureau by residents of the neighbor-
od and had become locally celebrated. The remains examined
rdly justify the name given to the site, which in former days was
ed as an encampment by wandering Indians rather than by sed-
tary people. Dr. Fewkes's attention was drawn also to a supposed
rtificial wall which gave name to Rockwall, not far from Dallas,
ex., but on examination this was found to be a natural sandstone
ormation.

Dr. Fewkes returned to Washington in November and immediately prepared a report on his summer's work in the Mesa Verde National Park for the use of the Department of the Interior, an advance summary of which, issued by the department, was widely published in the newspapers. An account of the excavation and repair of Oak-tree House and Painted House, the largest cliff ruins in Fewkes Canyon, was also prepared for publication. On the completion of these tasks Dr. Fewkes devoted the remainder of his limited time to the preparation of the extended memoir on The Aborigines of the West Indies for publication in a report of the bureau. In June he again departed for the field with the view of initiating, before the close of the fiscal year, an inquiry into the archæological evidences bearing on Hopi legends that ancestors of the clans of the ancient pueblo of Sikyatki lived at Tebungki, or Beshbito, an oval ruin 15 miles east of Keams Canyon, Ariz. Dr. Fewkes visited and surveyed the ruin and made photographs and notes thereof. He likewise investigated certain large ruins east of Tebungki, on the ancient trail of migration from Chaco Canyon, and traced for some distance the prehistoric trail running from San Juan Valley southward past the great ruins, as yet undescribed, near Crownpoint, N. Mex.

During the months of July to December, 1915, Mr. James Mooney, ethnologist, continued to devote most of his attention to the preparation for publication of the Cherokee Sacred Formulas, including transliteration, translation, and explanation of each formula, with complete glossary and botanic index. These formulas, collected by Mr. Mooney on the East Cherokee Reservation in North Carolina, are written in the Cherokee language and alphabet and held for their own secret use by priests of the tribe, most of them long since dead. They consist of prayers, songs, and prescriptions, dealing with medicine, love, hunting, fishing, agriculture, war, the ball play, self-protection, etc. They number in all between 500 and 550, contained in several manuscripts, as follows:

1. *Gadigwanasti* ("Belt," died 1888).—186 in a large blank book of foolscap size, and 94 others on separate sheets of the same size, closely written; 280 in all. Obtained from his son.
2. *A'yuñini* ("Swimmer," died 1899).—Written in an unpaged blank book of 242 pages, 3½ by 12 inches, only partially filled; 137 in all. Obtained from himself and transliterated and translated with full explanation from his distation in 1888.
3. *A'wanita* ("Young Deer," died about 1892).—24 written on separate sheets and obtained from him in 1888. Transcribed later into No 4.
4. *Tsiskwa* ("Bird," died 1889).—22, dictated from deathbed and with other formulas written out in regular fashion, with index, in a blank book of 200 pages, 8 by 10 inches, by his nephew, W. W. Long (Wiliwesti), in 1889.
5. *Dagwatihi* ("Catawba Killer," died about 1890.—Written out from his dictation by W. W. Long, in No. 4, in 1889; 11 in all.
6. *Gahuni* (died 1866).—10 in all, together with a Cherokee-English vocabulary in Cherokee characters and other miscellany, contained in an unpaged blank book, 6 by 14 inches. Obtained in 1889 from his widow, Ayâsta, mother of W. W. Long.
7. *Other formulas* originally written by Inâli ("Black Fox," died about 1880), Yânûgûlegi ("Climbing Bear," died 1904, Dûninâli ("Tracker," still living), Ayâsta ("Spoiler," died 1916), Âganstâta ("Groundhog Meat," still living), and others; mostly transcribed into No. 4.
8. A large number of dance songs, ceremonial addresses, Civil War letters from Cherokee in the Confederate service, council records, etc., all in the Cherokee language and characters, contained in various original blank book manuscripts and letter sheets. Some of these have been transcribed into No. 4, and many of them might properly appear with the Sacred Formulas.

Of all this material, about 150 formulas, including the entire Swimmer book, No. 2, were transliterated, translated, and annotated and glossarized, with Swimmer's assistance, in 1888–89. Of e, 28 specimen formulas were published in 1891 in "Sacred mulas of the Cherokees," in the Seventh Annual Report of the ɜau. The manuscript glossary for the whole 150 formulas num- ; about 2,000 words.

.ll the other formulas, together with the more important miscel- ʏ noted under No. 8, were transliterated and translated with inter- ar translation in the summers of 1911–14, together with such itional explanation as might be furnished by surviving experts. o some 500 or 600 plants noted in the medical prescriptions have ı collected in the field, with their Cherokee names and uses, and botanic identification made by assistance of the botanists of the ional Museum. This entire body, exclusive of No. 2 completed, is ʏ in process of final transcription and elaboration, with explana- ı, botanic appendix, and glossary. Most of the work at present is ıg devoted to the Gadĭgwanasti manuscript, but the interdepend- e of the formulas necessitates frequent shifting from one to ther. The glossary proceeds incidentally with the final transla- ı, but more slowly as the full import of the words becomes mani- t. Many of the words and expressions are technical, symbolic, and ırchaic and unusual dialectic forms, with corresponding difficulty interpretation. The complete glossary will probably comprise at st 4,000 words.

he botanic section will consist of a list of all the plants used in formulas, as stated, and of some others of special importance, h their Indian names and meanings, botanic identification, and erokee uses as deduced from the various formulas and from direct ormation.

n explanation of the method and significance of the ceremony, preparation of the medicine and the manner of its application l accompany each formula, but this work is deferred to the end, insure symmetrical treatment without unnecessary repetition.

t is planned to have one or more introductory chapters explana- y of the Cherokee mythology, beliefs relating to the spiritual and ult world, ceremonial observances, initiation of hunters, and other tters illustrative of the formulas, together with parallels from ıer tribal systems, and also a chapter explanatory of the peculiar guistic forms.

More than 200 formulas have received final form. The finished rk will fill at least one large report volume and require a year for npletion.

In July and August, 1915, Mr. Mooney gave considerable time to nishing information and suggestions for the proposed Sequoya tue intended to constitute Oklahoma's contribution to the Capitol llery. The usual number of letter requests for miscellaneous in- rmation also received attention.

On May 27 Mr. Mooney proceeded to western North Carolina for the purpose of continuing his Cherokee studies, and at the close of the fiscal year was still in the field.

Dr. John R. Swanton, ethnologist, devoted the greater part of the year to his memoirs pertaining to the Creek and associated tribes, to which reference was made in the last report. The first of these, dealing with the habitat and classification of the former Southeastern Indians, their history and population, is nearly completed; it consists of upward of 750 typewritten pages, exclusive of the bibliography, all of which has been put in order and annotated. Some new manuscript sources of information have recently been discovered which will make further additions necessary, but with this exception the text is now complete. Six maps are to be used in illustration; two of these, which are entirely new, are now being made, and the others are to be reproductions. The second paper, to cover the social organization and social customs of the Creeks and their neighbors, has likewise been arranged and annotated, but it is being held in order to incorporate the results of further field research.

From the end of September until the latter part of November, 1915, Dr. Swanton was in Oklahoma, where he collected 113 pages of Natchez text from one of the three surviving speakers of the language; he also spent about three weeks among the Creek Indians, where about 80 pages of myths in English were procured. Further ethnological material was also obtained from the Creeks and from the Chickasaw, to whom a preliminary visit was made. While with the former people Dr. Swanton perfected arrangements with a young man to furnish texts in the native language, which he is able to write fluently, and in this way 173 pages have been submitted, not including translation. From Judge G. W. Grayson, of Eufaula, Okla., to whom the bureau has been constantly indebted in many ways, was obtained in Creek and English, and also in the form of a dictaphone record, a speech of the kind formerly delivered at the annual *poskita*, or busk, ceremony of the Creeks. From an Alibamu correspondent, referred to in previous reports, some additions to the Alibamu vocabulary and a few pages of Alibamu text were procured.

At the beginning of the fiscal year Mr. J. N. B. Hewitt, ethnologist, transcribed and edited the Seneca text "Dooä'dane'gĕⁿ' and Hotkwisdadegĕ'ⁿ'a; making 45 pages, to which he added a literal interlinear translation that required more than twice as many English words as Indian, the whole being equivalent to about 130 pages. This text is a part of the Seneca material now in press for the Thirty-second Annual Report of the bureau. Mr. Hewitt also read for correction, emendation, and expansion, the galley proofs of Curtin's Seneca material, and prepared more than 50 pages of notes and additions for the introduction and also for the text; he also has ready

es and corrections for the proofs still to come. From unedited
t Mr. Hewitt completed a free translation of 32 pages of the Onon-
ga version of the "requickening address" of the Ritual of Con-
ence of the League of the Iroquois, being a part of the material
his projected memoir on the Iroquois League.

After the material of the Seneca legends had been submitted for
inting, Mr. Curtin's field records and notes, made while recording
is material, came into possession of the bureau. Mr. Hewitt de-
ted much time to reading and examining this undigested material,
ne 4,000 pages, for the purpose of ascertaining whether part of it
ould be utilized for printing or for illustrative purposes in what
is already in type. This examination yielded some good material
r notes and interpretations, but only small return as to new ma-
rial for printing.

In the early autumn Mr. Hewitt made special preparations for the
osecution of field work on his projected memoir on the League of
e Iroquois, by tentative editing and copying of a number of
ohawk and Onondaga texts recorded hastily in the field in pre-
ious years. The following parts of the Ritual of the Condolence
ouncil were thus typewritten: The fore part of the Ceremony of
ondolence, called "Beside-The-Forest," or "Beside-The-Thicket,"
n Mohawk; the so-called "Requickening Address," in the Onondaga
ersion, and also the explanatory "introduction" and the "reply"
n Onondaga to the "Beside-The-Forest" address already noted;
nd the installation address in Onondaga, made by Dekanawida to
he last two Seneca leaders to join the League, was likewise edited
nd typewritten. Mr. Hewitt also devoted much study to other
arts of the League material, for the purpose of being able to dis-
uss it intelligently and critically with native informants. Some of
he most striking results of this year's field work are due to this
reparatory study of the material already in hand. Mr. Hewitt spent
any days in the office in searching out and preparing data for
plies to correspondents of the bureau.

On April 17, 1916, Mr. Hewitt left Washington for the Six Nations
serve near Brantford, Ontario, for the purpose of resuming field
ork, having in view primarily the putting into final form of the
nondaga and Mohawk texts pertaining to the League of the Iro-
uois, recorded in former years. These texts cover a wide range of
ubjects and represent the first serious attempt to record in these
nguages very technical and highly figurative language from per-
ons unaccustomed to dictate connected texts for recording. These
ext embody laws, decisions, rituals, ceremonies, and constitutional
rinciples; hence it is essential that correct verbal and grammatic
orms be given.

One of the most important results of Mr. Hewitt's field studies is the demonstration that, contrary to all available written records and various printed accounts, there were never more than 49 federal civil chiefs of the League of the Iroquois, and that the number 50, due to misconception of the meaning of ordinary terms by Thomas Webster of the New York Onondaga, who died about 30 years ago, is modern and unhistorical. This false teaching has gained credence because it arose only after the dissolution of the integrity of the League of the Iroquois in the years following its wars with the United States, when most of the tribes became divided, some removing to Canada and some remaining in New York State, a condition which naturally fostered new interpretations and newer versions of older legends and traditions.

Mr. Hewitt also recorded a Cayuga version of the so-called Dekanawida tradition, comprising 130 pages of text, dictated by Chief John H. Gibson, which purports to relate the events that led to the founding of the League or Confederation of the Five Iroquois tribes and the part taken therein by the principal actors. In this interesting version Dekanawida is known only by the epithet "The Fatherless," or literally "He Who is Fatherless," which emphasizes the prophecy that he would be born of a virgin. In this version "The Fatherless" is represented as establishing among the Cayuga tribesmen the exact form of government that later he founded among the Five Iroquois tribes. It is said that the Cayuga selfishly limited the scope of that form of government, and therefore, its benefits, to the Cayuga people alone, for the Cayuga statesmen did not conceive of its applicability to the affairs and welfare of all men. And so, this tradition affirms, it became needful that "The Fatherless" return to the neighbor tribes of the Cayuga to establish among them the League of the Five Tribes of the Iroquois, which was designed to be shared by all the tribes of men. This event is mentioned in the other Dekanawida versions.

This Cayuga version also purports to explain the origin of the dualism lying at the foundation of all public institutions of Iroquois peoples, by attributing the first such organization among the Cayuga to two persons who were related to each other as "Father and Son," or "Mother and Daughter," and who agreed to conduct public affairs jointly. This statement of course is somewhat wide of the mark, because it does not explain the existence of similar dualisms among other tribes such dualisms resting commonly, in the social organization, on the dramatization of the relation of the male and female principles in nature.

Mr. Hewitt was also able to confirm another radical exegesis of a part of the installation ceremony of the League of the Iroquois as first proposed by himself. This deals with the significance and correct translation of the words of the famous "Six Songs" of ceremony. All other interpreters who have attempted to trans- these words have assumed that these songs are "songs of greeting l welcome," but Mr. Hewitt, solely on grammatic grounds and the ition of these songs, regards them rather as "songs of parting," " songs of farewell," which are dramatically sung by an imperson- r for the dead chief or chiefs.

Mr. Hewitt also recorded, in the Onondaga dialect, a short legend criptive of the three Air or Wind Beings or Gods, the so-called ñdu′′i, the patrons of the Wooden-mask or "False-face" Society, ose chief function is the exorcism of disease out of the community l out of the bodies of ill persons; another on the Medicine Flute; ther on the Husk-mask Society; and another on the moccasin me used at the wake for a dead chief: in all more than 100 pages of t not related to the material dealing with the Iroquois League.

While in the field Mr. Hewitt purchased a number of fine specimens strating Iroquois culture, exhibiting art of a high order; these sist of a wooden mask, colored black; a husk-mask; two small ms; a "medicine" flute; a moccasin game used at a chief's wake; pair of deer-hoof rattles; a horn rattle; and a squash rattle. ring the time he was in the field, until the close of the fiscal year, . Hewitt read, studied, corrected, and annotated about 8,000 lines text other than that mentioned above, and also made a number of otographs of Indians.

Mr. Francis La Flesche, ethnologist, was engaged in assembling his tes on the rites of the Osage tribe. Up to the month of February, 0 pages of the ritual of the Fasting degree of the war rites were ished, completing that degree, which comprises 492 pages. The thadse, or Rush-mat degree, was next taken up and completed; is degree covers 104 pages. The Child-naming ritual was then mmenced, and 21 pages have been finished.

In September, while on leave of absence, Mr. La Flesche was visited the Omaha reservation by Xuthá Wato^{n}i^n of the Tsízhu Wano^n ns, who gave a description of the Washábe Athi^n, or war ceremony, he remembered it. With this description he gave 5 wígie and 14 ngs. The wígie and the words of the songs have been tran- ribed from the dictaphone but are not yet typewritten, and the usic of the songs has not yet been transcribed. A number of ories also were obtained from Xuthá Wato^{n}i^n, among them that f the Osage traditional story of the separation of the Omaha and sage tribes. Xuthá Wato^{n}i^n died soon after his return home, his eath being regarded by many as confirming the old-time belief that nyone who recites informally the rituals associated with these cere- onies will inevitably suffer dire punishment. The death of this old man shortly after giving the rituals has therefore added to the difficulties attending the task of recording these ancient rites.

Notwithstanding these obstacles, Mr. La Flesche succeeded, during his visit to the Osage Reservation in April and May, in securing from old Sho^{n}'gemo^{n}i^{n} the version of the Fasting ritual belonging to the Tsízhu Peace gens, of which he is a member. The wígie and the words of the songs have been transcribed from the dictaphone, but are not yet typewritten, and the music of the songs is also to be transcribed. Sho^{n}'gemo^{n}i^{n} likewise gave the Child-naming ritual belonging to his gens, in which there are two wígie, one containing 227 lines and the other 94. In addition to these rituals, Sho^{n}'gemo^{n}i^{n}, after considerable hesitancy, recounted the "Seven and Six" (13) coups he is always called on to recount when any No^{n}'ho^{n}zhi^{n}ga of the Ho^{n}'ga division performs the ceremonies of some of the war rites. For this service he is paid a horse and goods amounting in value from $125 to $150.

Mr. La Flesche also secured from Waxthízhi information concerning the duties of the two hereditary chiefs of the Osage tribe, the gentes from which they were chosen, and how their orders were enforced. He also obtained from Watśemo^{n}i^{n} two wígie, one recited by him at the ceremonies of the war rites, and the other by the Nó^{n}ho^{n}zhi^{n}ga of the Hó^{n}ga Ahiuto^{n} gens.

In these studies Mr. La Flesche was materially assisted by Washóshe and his wife, who have both overcome their aversion to telling of the rites. Washóshe resigned from the Nó^{n}ho^{n}zhi^{n}ga order because of the injustice of its members toward a woman whom he selected to weave ceremonially the rush-mat shrine for a waxobe when he was taking the Çathadse degree. This man presented to Mr. La Flesche a mnemonic stick owned by his father and gave the titles of the groups of lines marked on the stick, each of which represents a group of songs. This mnemonic stick will be placed in the National Museum with the Osage collection.

Mr. John P. Harrington, ethnologist, spent the entire fiscal year in making an exhaustive study of the Indians of the Chumashan linguistic stock of southern California. Three different bases have been established for working with informants and elaborating the notes. The period from July to October, inclusive, was spent at San Diego, Cal., where every facility for the work was granted by the courtesy of the Panama-California Exposition; November to March, inclusive, at the Southwest Museum, Los Angeles; and April to June, inclusive, at Santa Ynez. The month of January, 1916, was spent at Berkeley, Cal., where, through the courtesy of the Bancroft Library of the University of California, various linguistic manuscripts and historical archives pertaining to the Chumashan stock were studies and copied. During the period named more than

0 words of manuscript material were obtained and elab-
. In addition to the grammatical and ethnological material
austive dictionary of the Ventureño is well under way, which
ises some 8,000 cards. This is to be followed by similar dic-
ies for the other dialects. The most satisfactory feature of
ork was the collection of material on the supposedly extinct
ts of San Luis Obispo and La Purísima. The Purisimeño
ial consists mainly of words and corrected vocabularies, while
Obispeño important grammatical material was also obtained.
ge part of the material which still remains to be obtained de-
on the life of two very old informants, consequently it is most
tant that Mr. Harrington continue his work in this immediate
ntil the opportunities are exhausted.

beginning of the fiscal year found Dr. Truman Michelson, eth-
ist, at Tama, Iowa, engaged in continuing his researches among
ox Indians, which consisted mainly of recording sociological
and ritualistic origin myths. In August, Dr. Michelson pro-
d to Oklahoma for the purpose of investigating the sociology
honetics of the Sauk Indians, as well as of obtaining transla-
of Fox texts pertaining especially to ritualistic origin myths.
successfully concluding this work, Dr. Michelson returned to
ington in October, when he commenced the translation of the
al material gathered in the field. Advantage was taken of the
nce in Washington of a deputation of Piegan in obtaining a de-
knowledge of Piegan terms of relationship. From these
es Dr. Michelson determined that the lists of relationship terms
ded by Lewis H. Morgan, as well as by other investigators, re-
revision. He also commenced to arrange the material gathered
e late Dr. William Jones pertaining to the ethnology of the
a Tribe, with a view of its publication as a bulletin of the
u. Toward the close of the year Dr. Michelson undertook to
e phonetically the text of the White Buffalo dance of the Fox
ns, which likewise is intended for bulletin publication. It is
ed that the results of this task will be ready for the printer
e the close of the calendar year.

Leo J. Frachtenberg, special ethnologist, divided his time, as
evious years, between field research and office work. On July 8
ft his winter headquarters at the United States training school
emawa, Oreg., and proceeded to the Yakima Reservation, Wash.,
e he revised, with the aid of the last Atfalati Indian, the
puya manuscript material collected in 1877 by the late Dr. A. S.
het of the bureau. This material, comprising 421 manuscript
, consists of vocables, stems, grammatical forms, and ethno-
al and historical narratives, and its revision marked the comple-

tion of the work on the Kalapuya linguistic family commenced two summers ago. This work lasted until the latter part of July. In conjunction with this particular phase of field work, Dr. Frachtenberg corrected the second revision of the galley proofs of his Siuslaw grammatical sketch to appear in the second part of Bulletin 40.

On returning to Chemawa, Dr. Frachtenberg took up the editing and typewriting of his grammatical sketch of the Alsea language, the compilation of which was completed during the previous winter; this was finished in the early part of October, and the complete sketch, consisting of 158 sections and 421 typewritten pages, was submitted for publication in the second part of the Handbook of American Indian Languages (Bulletin 40). Dr. Frachtenberg interrupted this work on August 22 and took a short trip to the Siletz Reservation, where he collected 52 Athapascan and Shastan songs, which were transmitted to the bureau for future analysis.

On October 7 he proceeded to the Quileute Reservation, where he enlisted the services of a Quileute informant, with whom he returned to Chemawa and brought to a successful completion the study of the grammar and mythology of the Quileute Tribe. This investigation extended from October until the latter part of March. The material collected by Dr. Frachtenberg during this period consists of 30 native myths and traditions fully translated, a large body of notes to these texts, voluminous grammatical forms, and vocables. In January Dr. Frachtenberg left Chemawa for a short trip to the Grand Ronde Reservation, Oreg., where he recorded 19 Kalapuya songs on the dictaphone.

As Dr. Frachtenberg's allotment for field work among the Quileute was then exhausted, he was obliged to remain at Chemawa until the close of the fiscal year. He therefore undertook the correction of the page proofs of his grammatical sketch of the Siuslaw language (pp. 431–629), and on its completion engaged in translating, editing, and typewriting the Alsea texts collected in 1910. The editing of these texts involved much labor, since it was deemed advisable to present in the introduction a complete discussion of Alsea mythology, and a concordance beween the folklore of this tribe and the myths of the other tribes of the Pacific coast. For that purpose all the published works on the folklore of the tribes of the northwestern area were consulted, including that of the Maidu, Shasta, Yana, Klamath, Takelma, Coos, Lower Umpqua, Tillamook, Chinook, Kathlamet, Wishram, Quinault, Chilcotin, Shuswap, Thompson River, Lillooet, Haida, Tlingit, Kwakiutl, Tsimshian, Bellacoola, and the Athapascan Tribes of the north. This work was practically completed by the close of the fiscal year. The collection consists of 8 creation myths, 13 miscellaneous tales, 3 ethnological and historical narratives, 4 statements as to religious beliefs, and 3 tales collected in English (31 traditions in all). It comprises, in addition to the introdution, 392 typewritten pages, and will be submitted for publication as a bulletin of the bureau.

SPECIAL RESEARCHES.

Dr. Franz Boas, honorary philologist, continued his researches connected with the preparation of the remainder of part 2 of the Handbook of American Indian Languages, assisted by Dr. Hermann K. Haeberlin, Miss H. A. Andrews, and Miss Mildred Downs, and also devoted attention to the completion of the report on Tsimshian mythology.

The bulletin on "Kutenai Tales," for which galleys were received in July, 1915, has been revised twice and is nearing completion. The page proof is being extracted preparatory to the accompanying grammatical sketch and vocabulary.

Through the liberality of Mr. Homer E. Sargent, of Chicago, it has been possible to do much work on the preparation of an extended paper on the Salish dialects, now comprising about 500 pages of manuscript. The material has been collected since 1886, partly by Dr. Boas himself and partly by Mr. James Teit, the considerable expense of the field work of Mr. Teit having been generously met by Mr. Sargent. In the course of the last 30 years it has been possible to collect vocabularies of all the Salish dialects, sufficient to afford a clear insight into the fundamental relations of these dialects, a preliminary work necessary to a more thorough study of the language. At the same time Mr. Teit gathered ethnological notes which are to be included in this work. The preparation of the vocabularies and of the detailed comparison that had been begun in previous years by Dr. Boas has been continued by Dr. Haeberlin, the basis of this study being their manuscript material and the published sources. Also through the liberality of Mr. Sargent and in cooperation with Columbia University in the city of New York, Dr. Haeberlin will be able to supplement his material by an investigation of one of the tribes of Puget Sound.

The interest of Mr. Sargent has also made possible a detailed study of the Salish basketry of the interior plateau and the preparation of the illustrations for a memoir on this subject. For the latter purpose there have been utilized the collections of the United States National Museum, the American Museum of Natural History, the University Museum of Philadelphia, the Museum of the American Indian (Heye Foundation), and the private collections of Mr. Sargent and others.

The preparation of a manuscript on the Ethnology of the Kwakiutl Indians has been well advanced. The material for the first volume, which is to contain data collected by Mr. George Hunt, has been completed, excluding a number of translations which remain to be elaborated. According to the plan, the work is to consist of two parts, the first a collection of data furnished by Mr. Hunt in answer to specific questions asked by Dr. Boas; the second a discussion of them, and other data collected on previous journeys to British Columbia. This volume is to consist of an account of the material culture, social organization, religion, and kindred subjects. Most of the illustrations for this volume have been completed, and about 1,600 pages of manuscript have been prepared. Miss Downs has made detailed extracts from Kwakiutl myths required for a discussion of this subject.

Miss Downs has also compared the proofs of Dr. Frachtenberg's Siuslaw grammar with published texts, and these proofs have been compared and passed on by Dr. Frachtenberg. This work completes the revision of the Siuslaw grammar, the publication of which has been delayed owing to various reasons.

No progress has been made toward the final publication of the Chukchee grammar, as it has been impossible to communicate with the author, Mr. W. Bogoras, who is in Russia.

Some progress has been made with the contributions to Mexican archeology and ethnology, to be edited by Prof. Alfred M. Tozzer, of Harvard University, with a view of their publication by the bureau as a bulletin. Dr. Paul Radin has furnished a manuscript on Huave; Dr. Haeberlin has nearly completed the study of modern Mexican tales, collected by Dr. Boas and by Miss Isabel Ramírez Castañeda; and Dr. Boas has been engaged in the preparation of material on certain types of Mexican pottery and on an account of a journey to Teul, Zacatecas.

Prof. W. H. Holmes, of the National Museum, completed for the bureau the preparation of part 1 of the Handbook of American Antiquities (Bulletin 60), and at the close of the year galley proofs of the entire work had been received and were in process of revision. On account of the pressure of more urgent work in connection with his official duties, only limited progress was made in the preparation of part 2. On April 21 Mr. Holmes made a brief visit to the museums of Philadelphia and New York for the purpose of conducting studies required in the preparation of this handbook.

Miss Frances Densmore's field trip during the summer of 1915 for the purpose of continuing her studies of Indian music, comprised visits to three reservations and occupied two and one-half months. Most of the time was spent among the Mandan and Hidatsa, at Fort Berthold, N. Dak., and during part of her sojourn Miss Densmore camped near what is recognized as the last Mandan settlement, where she was enabled to record many interesting data that could not have been obtained in any other way. The Indians felt more free to sing there than at the agency, and Miss Densmore also had an 'tunity to observe and photograph native customs, notably those ıning a hide and preparing corn. The study of music on the Berthold Reservation included that pertaining to the ceremony cted with eagle catching. An old eagle trap was visited and ›graphed, and the songs of the leader in the eagle camp were ded by the only Mandan who had the hereditary right to sing

The songs of the Goose Women Society and the Creek Women ty were also sung by those who inherited them and were re- d phonographically. Among these are the ceremonial songs by the "corn priest" in the spring to fructify the seed corn. s of war and of the various men's societies were also recorded. total number of songs from this reservation now transcribed ds 100.

new phase of the work was that of ascertaining the pitch dis- nation of the Indians by means of tuning forks. This was be- ıt Fort Berthold and continued for comparative purposes at tanding Rock and White Earth Reservations. Data from four ; are now available on this subject of research.

ss Densmore read all the galley and part of the page proofs e bulletin on Teton Sioux Music. Important additions were to this book in the form of graphic representations, original of 240 songs and 18 diagrams having been made to exhibit results obtained through mathematical analyses. Of these ıic representations 63 will appear in the bulletin. One hundred fifty pages of manuscript were submitted during the year, in ion to the descriptive analyses of the songs.

the preparation of the Handbook of Aboriginal Remains East e Mississippi, Mr. D. I. Bushnell, jr., added much new material. ȓ letters were sent to county officials in New England requesting mation regarding the location of ancient village sites, burial s, and other traces of aboriginal occupancy in their respective . Many of the replies contained valuable and interesting infor- ɔn. Letters of like nature were addressed to officials in the hern States, and the replies were equally satisfactory. Numer- ›hotographs have been received from various sources, which will as illustrations for the handbook, but it is desired to increase umber if possible. The manuscript of the handbook will prob- be completed during the next fiscal year.

'. Walter Hough, of the National Museum, was detailed to the ıu in June for the purpose of conducting archeological investi- ›ns in western central New Mexico. Proceeding to Luna, So- › County, Dr. Hough commenced the excavation of a ruin pre- sly located by him, as described in Bulletin 35 of the bureau ›9). This site was thought to contain evidence of pit dwellings ısively, but excavations showed that an area of about 40 acres contained circular, semisubterranean houses in which no stone was used for construction. Seven of the pits were cleared, and it was ascertained that many more existed beneath the surface, dug in the sandy substratum of the region. Burnt sections of roofing clay showed that these houses were roofed with beams, poles, brush, and mud, as in present pueblo construction. The roof was supported by wooden posts, charred remains of which were found. Nothing was ascertained respecting the construction of the sides of the dwellings or in regard to the height of the roofs. On the floor of each of the pits uncovered were a rude metate, grinding stones, slabs of stone, and the outline of an otherwise undefined fireplace not quite in the center of the chamber. A bench about a foot high and a few feet in length was cut in the wall of some of the pits, and in one of the pits, against the wall, was a fireplace with raised sides of clay.

Another type of structures adjoined the pits; these were rectangular, open-air houses with mud roofs, in which mealing and culinary work was carried on. Here were numerous metates, manos, rubbing stones, pottery, etc.; some of the metates were set up on three round stones. Near the pit was a cemetery in which infants were buried, the burials being associated with clay hearths and much charcoal, and near the bodies were placed small pottery vessels. Scrapers of flint and bones of deer were also found among the burials. So far as ascertained, the people who used the circular semisubterranean houses had a limited range. Traces of their culture have not been found below an elevation of 7,000 feet in the mountain valley, and it appears probable that their culture was associated with an environment of lakes which once existed in these valleys. It is evident in some cases that the pit dwellings were displaced by houses of stone. In most instances artifacts are different from those of the stone-house builders, and the latter have more points of resemblance to, than of difference from, the ancient inhabitants of Blue River. It is probable that the range of the pit-house people would be found to be more extensive by excavation around the sides of stone houses in other localities, the remains of pit structures being easily obliterated by natural filling. At this time the pit-dweller culture can be affiliated only with uncertainty with that of the ancient Pueblos. At the present stage of the investigation the lack of skeletal material is severely felt, but further work may overcome this difficulty.

In continuation of his preliminary examination of archeological remains in western Utah, summarized in the last annual report of the bureau (pp. 51–53), Mr. Neil M. Judd, of the National Museum, returned to Utah in June, 1916, and excavated one of the large mounds near Paragonah, in Iron County. Limited in time and handicapped by unfavorable weather, the results obtained were less than those anticipated; nevertheless they show the similarity existing een the ancient Paragonah dwellings and those near Beaver and neighboring settlements, and warrant the belief that the lers of these structures were more closely related to the house-ling peoples of Arizona and New Mexico than has been suspected. the report following his reconnoissance of last year, Mr. Judd attention to the fact that the mounds still existing near Para-h comprise a mere remnant of the large group formerly at that ɜ and predicted the early razing of those remaining. The hurried stigation of this year was undertaken for the purpose of gaining mation regarding these ruins before their destruction.

ıe of the largest and, at the same time, one of the least disturbed nds was selected as a type for excavation. Its dimensions were oximately 100 by 300 feet; its average height was 4½ feet. Two t gashes had been made through the opposite ends of the mound liggings of many years ago, each cut partially exposing the s of a single long room. Including these two dwellings, which ɜ reexcavated only with considerable difficulty, Mr. Judd suc-fully revealed and measured the walls of 14 rectangular houses, f which are entirely cleared of fallen débris and earth accumula-. The walls of these ancient habitations, like those previously nined near Beaver City, had been constructed entirely of adobe l; in their present condition they exhibited no evidence of the of angular bricks or blocks similar to those employed in Pueblo ctures subsequent to the Spanish conquest. On the contrary, e examination showed that the walls were invariably formed by union of innumerable masses of plastic clay, forced together by hands of the builders and surfaced inside and out during the ess of construction. Careful inspection of the ruins showed that dwellings were originally roofed in the manner typical of cliff ses and of modern Pueblo structures throughout the Southwest. certain evidence could be found that doors or other wall openings e utilized by the primitive artisans—each house invariably con-d of a single room that apparently had been entered from the . One of the most important discoveries made during the se of the Paragonah excavations was that of a circular, semi-erranean room which, with similar wall fragments previously overed in the Beaver City mounds, tends to establish the use of kiva, or ceremonial chamber, by the ancient house-building ples of western Utah.

n the conclusion of his studies at Paragonah, Mr. Judd proceeded 'illmore, Willard County, for the purpose of investigating cer-ı mounds reported in that neighborhood. These and similar ele-ions near the villages of Meadow, Deseret, and Hinckley, were all erficially identified as of the same type and representing the same degree of culture as those above described. In all a collection of more than 500 objects was gathered during the course of the season's work.

A pleasing coincidence resulting from Mr. Judd's Fillmore investigation was the fact that the guide he engaged had been employed in the same capacity by Dr. Edward Palmer, one of the National Museum's most indefatigable collectors, during the latter's expedition of 1872.

The archeological data collected by Mr. Judd during his two brief expeditions to western Utah are sufficient to warrant the extension of the northern limits of the area known to have been occupied by the ancient Pueblo peoples. Further work, however, is urgent, since that already accomplished has not only contributed certain valuable facts to Southwestern archeology, but it has shown also the probability of finding, in the unknown desert regions of that section, a solution of some of the vital questions with which American anthropology has labored for many years.

By reason of the fact that Mr. James R. Murie has been engaged by the American Museum of Natural History, New York City, in connection with its ethnologic researches pertaining to the Plains Indians, his work of recording the rites and ceremonies of the Pawnee Tribe came to a close, and tentative arrangements have been made whereby the American Museum will complete the investigation and the results published by the bureau. Dr. Clark Wissler, curator of anthropology of the American Museum, has undertaken this task.

Dr A. L. Kroeber, of the University of California, continued the preparation of the Handbook of the Indians of California for publication by the bureau, and at this writing it is believed that the manuscript, with the accompanying maps and illustrations, will be submitted for publication before the close of the calendar year.

MANUSCRIPTS.

The large collection of manuscripts in possession of the bureau was augmented by the following principal items, which do not include manuscripts in process of preparation by members of the bureau's staff for publication:

Miami-French dictionary; photostat copy of the original in the John Carter Brown Library at Providence, R. I.

A number of notebooks from Dr. A. L. Kroeber, on Gros Ventre and Cheyenne-Arapaho linguistics and texts. These consist of: (*a*) Gros Ventre, 41–47, 49; (*b*) Arapaho and Cheyenne, 1–14, 21–22, 24–28, and also a catalogue of this material recorded on 3,500 cards; (*c*) 110 pages of manuscript on the same subjects.

First draft of Gatschet's Klamath Dictionary, 177 pages.

s of the following manuscripts, made by photostat in the
by the courtesy of Rev. George Worpenberg, S. J., librarian
lary's College, St. Marys, Kans.:

ism dans la langue Potewatèmi, A. D. 1847.
atechism en Langue Potewatemi, A. D. 1848.
lia Dom, and Evangelia in Festis, and portions of the Gospels read
ys and certain Festivals of the Saints.

PUBLICATIONS.

ask of editing the publications of the bureau has continued
ge of Mr. J. G. Gurley, editor, assisted from time to time by
ances S. Nichols. Following is a summary for the year:

PUBLICATIONS ISSUED.

-ninth Annual Report (1907–08). Accompanying paper: The Ethno-
y of the Tewa Indians, by John Peabody Harrington.
th Annual Report (1908–09). Accompanying papers: Ethnobotany of the
ians (Stevenson); An Inquiry into the Animism and Folk-lore of the
ndians (Roth).
n 57. An Introduction to the Study of the Maya Hieroglyphs (Mor-

n 62. Physical Anthropology of the Lenape or Delawares, and of the
Indians in General (Hrdlička).

PUBLICATIONS IN PRESS OR IN PREPARATION.

first Annual Report (1909–10). Accompanying paper: Tsimshian
y (Boas).
second Annual Report (1910–11). Accompanying paper: Seneca Fiction,
and Myths (collected by Jeremiah Curtin and J. N. B. Hewitt; edited
B. Hewitt).
third Annual Report (1911–12). Accompanying papers: Designs on Pre-
Iopi Pottery (Fewkes); Preliminary Account of the Antiquities of the
etween the Mancos and La Plata Rivers in Southwestern Colorado
; Uses of Plants by the Indians of the Nebraska Region (Gilmore);
xcavation in the Eastern Maya Area, with an Introduction dealing
General Culture of the Natives (Gann).
n 40. Handbook of American Indian Languages (Boas). Part 2.
n 55. Ethnobotany of the Tewa Indians (Robbins, Harrington, Freire-

n 59. Kutenai Tales (Boas).
n 60. Handbook of Aboriginal American Antiquities, Part 1. Intro-
The Lithic Industries: Mining, Quarrying, Manufacture (Holmes).
n 61. Teton Sioux Music (Densmore).

listribution of the publications of the bureau has continued
ediate charge of Miss Helen Munroe, of the Smithsonian
ion, and at times by Mr. E. L. Springer, assisted from the
ng of the fiscal year until his resignation on April 15 by Mr.
Iumphrey, and subsequently by Miss Lana V. Schelski. Not-
nding conditions in Europe and the impossibility of sending
tions abroad except to a very limited extent, 2,235 more pub-

lications were distributed than during the previous fiscal year. This distribution may be classified as follows:

Series.	Copies.
Annual reports and separates	2,036
Bulletins and separates	9,990
Contributions to North American Ethnology—volumes and separates	18
Introductions	9
Miscellaneous publications	367
	12,420

ILLUSTRATIONS.

Mr. DeLancey Gill, illustrator, has continued in charge of the preparation of the illustrations for the publications of the bureau and of photographing the members of visiting Indian deputations to Washington, in which work he has been assisted by Mr. Albert E. Sweeney. The results accomplished in this direction are as follows:

	Number.
Photographic prints for distribution and office use	1,137
Negatives of ethnologic and archeologic subjects	126
Negative films developed from field exposures	188
Photostat prints from books and manuscripts	1,125
Mounts used	78
Proofs examined	251
Photographs retouched	43
Drawings made	187
Portrait negatives of visiting delegations (Pawnee, Sauk and Fox, Winnebago, Blackfoot, Cheyenne, Chippewa)	25

The complete editions of three colored plates, aggregating 20,000 prints, were examined at the Government Printing Office. Illustrative material for three bulletins was completed for reproduction, and progress was made on similar work for the Thirty-third Annual Report.

LIBRARY.

The library of the bureau continued in charge of Miss Ella Leary, librarian, assisted by Charles B. Newman, messenger boy. During the year 1,078 volumes were accessioned; of these 214 were purchased, 135 were acquired by gift and exchange, and 729 are volumes of serials which were entered after having been bound for the first time. The library also procured 272 pamphlets, chiefly by gift. The periodicals currently received number about 750, of which 12 are acquired by subscription and 738 by exchange. Among the more noteworthy accessions of books are 20 volumes of Bibles, Testaments, and portions of the Bible in American Indian languages. The library now contains about 21,315 volumes, 13,460 pamphlets, and several thousand unbound periodicals. There were sent to the Government Printing Office for binding, 1,338 books, pamphlets, and ial publications, and of these all but 20 had been returned to the reau before the close of the year.

In addition to the cataloguing of current accessions the efforts of e librarian were devoted to making a subject, author, and analyti-l catalogue of the books represented in the old catalogue by an perfect author catalogue alone. In this connection special atten-on was given to linguistic works. From time to time Mrs. F. S. ichols has assisted in this work, and satisfactory progress has been ade.

Although maintained primarily for the use of the staff, the library consulted more and more by students not members of the bureau, s well as by officials of the Library of Congress and of the Govern-ent departments.

COLLECTIONS.

The following collections were acquired by the bureau, by members f its staff, or by those detailed in connection with its researches, and ave been transferred to the National Museum:

704 archeological objects gathered in Utah and Wyoming by Mr. Neil M. udd. (58757.)

Collection of potsherds showing types of ornamentation, from the Nacoochee ound, White County, Georgia, being a part of the objects gathered by the oint expedition of the Bureau of American Ethnology and Museum of the merican Indian (Heye Foundation). (58819.)

170 archeological specimens collected by Mr. Gerard Fowke at the flint quarry op sites at Crescent, St. Louis County, Missouri. (59015.)

Collection of nonhuman bones from the Nacoochee Mound, Georgia. (59017.)

A small collection of prayer-sticks from a Pueblo shrine on the summit of ngley Peak, west of the Rio Grande and south of the Rio Chama, New exico, presented by Mr. Robert H. Chapman. (59112.)

53 Indian potsherds and arrow points presented by Mr. Arthur L. Norman, oup, Texas. (59252.)

Stone "collar" from Porto Rico, received by purchase from Mr. K. A. Behne, n German, Porto Rico. (59280.)

A point and tackle of a salmon spear; a halibut hook, and five small fish-oks, the gift of Mr. Robert H. Chapman. (59288.)

Set of ear perforators formerly owned by Wâthuxage of the Tsízhu Wash-ge gens of the Osage, presented through Mr. Francis La Flesche by Mrs. Fred okout. (59782.)

Sacred hawk bundle, or waxobe, of the Buffalo-face People of the Osage ibe, collected by Mr. Francis La Flesche. (59792.)

Osage war shield, collected by Mr. Francis La Flesche. (59934.)

PROPERTY.

In regard to the property of the bureau there is nothing to add o the statements presented in recent reports. The cost of necessary furniture, typewriters, and photographic and other apparatus ac-quired during the fiscal year was $238.54.

MISCELLANEOUS.

Quarters.—One of the rooms in the north tower occupied by the bureau force was repaired and painted, a new electric fixture installed, and the wooden casing under the exposed stairway removed and fireproofing substituted.

Personnel.—The only change in the personnel of the bureau was the resignation of Mr. William A. Humphrey, stenographer and typewriter, on April 15, 1916, and the appointment of Miss Lana V. Schelski on May 15 to fill the vacancy.

The correspondence and other clerical work of the office, in addition to that above mentioned, has been conducted by Miss Florence M. Poast, clerk to the ethnologist in charge; Miss May S. Clark, who particularly aided Mr. Bushnell in correspondence connected with the preparation of the Handbook of Aboriginal Remains; and Mrs. F. S. Nichols, who has aided the editor.

Respectfully submitted.

F. W. Hodge,
Ethnologist in Charge.

Dr. Charles D. Walcott,
Secretary of the Smithsonian Institution,
Washington, D. C.

APPENDIX 3.

ORT ON THE INTERNATIONAL EXCHANGES.

have the honor to submit the following report on the opera-
the International Exchange Service during the fiscal year
une 30, 1916.
ongressional appropriation for the support of the service
he year, including the allotment for printing and binding,
200 (the same amount as appropriated for the past eight
nd the repayments from departmental and other establish-
gregated $3,678.25, making the total available resources for
on the system of exchanges $35,878.25.
g the year 1916 the total number of packages handled was
an increase of 25,869, as compared with the preceding year.
ght of these packages was 399,695 pounds, an increase of
ounds.
igh these figures show an increase in the amount of work
n by the service over that for last year, both the number and
f the packages handled are lower than for the year 1914.
uction, however, is accounted for by the suspension of ship-
a number of countries, owing to the European war, as ex-
n the last report.
umber and weight of the packages of different classes are
l in the following table:

	Packages.		Weight.	
	Sent.	Received.	Sent.	Received.
			Pounds.	*Pounds.*
s parliamentary documents sent abroad	161,265	....	93,458	....
received in return for parliamentary documents	....	3,073	....	16,938
s departmental documents sent abroad	72,766	....	142,415	....
received in return for departmental documents	....	4,352	....	8,911
s scientific and literary publications sent abroad	42,862	....	84,196	....
s scientific and literary publications received from distribution in the United States	....	17,307	....	53,777
	276,893	24,732	320,069	79,626
total	301,625		399,695	

In connection with the above statistics, attention should be called to the fact that many returns for publications sent abroad reach their destinations direct by mail and not through the Exchange Service.

Of the 1,758 boxes used in forwarding exchanges to foreign agencies for distribution, 319 contained full sets of United States official documents for authorized depositories, and 1,439 were filled with departmental and other publications for depositories of partial sets and for miscellaneous correspondents. The total number of boxes sent abroad during 1916 was 105 more than the preceding year.

As referred to last year, the interruption to transportation facilities caused by the European war made it necessary for the International Exchange Service in August, 1914, to suspend the shipment of consignments to Austria, Belgium, Bulgaria, Germany, Hungary, Montenegro, Roumania, Russia, Serbia, and Turkey. With the exception of Germany, exchange relations with these countries are still suspended. It has been possible to arrange for the sending of several consignments to Germany through the American consul general at Rotterdam, but the Institution has not yet undertaken the regular transmission of boxes to that country. One shipment has been received from Germany, and the Institution, through the Department of State, has arranged with the British Government for the sending of consignments from Germany to this country at bimonthly intervals.

In May, 1915, as mentioned in the last report, the Institution endeavored to arrange with the Commission of International Exchanges at Petrograd for the resumption of shipments to Russia by way of Archangel, but the commission then expressed a desire to postpone the renewal of operations until after the close of the war. The commission now writes that it has been found possible to resume the forwarding of consignments either by way of Vladivostok, Russia, or Bergen, Norway. The Institution has signified its preference for the latter route, at the same time asking if shipments can be forwarded to Russia through the same port.

Through the burning at sea of the steamship *Mount Eagle*, box 125, containing publications from various governmental and scientific establishments in this country for distribution in Korea, was destroyed. Owing to a similar accident to the steamship *Athenai*, box 231, for Greece, was lost. In almost every instance the Institution was able to procure from the senders duplicate copies of the lost publications, which were duly forwarded to their destinations. In this connection it should be stated that the destruction of the above-mentioned vessels was not due to the war. Thus far only two exchange packages—each containing 12 publications—have been lost the sinking of steamers by war vessels, reference to which le in the last report.

itinuation of a policy of international helpfulness, the Instiias rendered aid to governmental and scientific establishoth in this and foreign countries, in procuring especially publications. One instance in particular in which the Instixtended aid during the year in procuring publications may red to in this connection. The Pan American Division of ierican Association for International Conciliation in New ity, which was assembling a library to consist of some seven thousand volumes of works of North American origin for ition to the Museo Social Argentino at Buenos Aires, applied, the Department of State, for a selection of publications of ted States Government and of certain scientific institutions country. The matter was brought to the attention of the establishments, and several hundred publications were refor the proposed library. The Department of State, in g this matter to the attention of the Institution, stated that artment attached considerable importance to the request as a neans of furthering the best ideals of Pan Americanism.

ly be stated in this connection that it is the custom of the ment of India to refer any requests from establishments in intry for Indian official documents to the Exchange Service orsement before acting thereon. In such instances statistics er information relative to the society or establishment making iest is furnished, and a proper recommendation is made in to the application.

iumber of boxes sent to each foreign country and the dates smission are shown in the following table:

Consignments of exchanges for foreign countries.

ountry.	Number of boxes.	Date of transmission.
....	51	July 21, Aug. 19, Sept. 30, Oct. 21, Nov. 26, 1915; Jan. 17, Feb. 18, Apr. 25, May 26, 1916.
....	6	July 16, Oct. 2, Nov. 12, Dec. 14, 1915; Feb. 3, Apr. 6, 1916.
....	37	July 21, Aug. 19, Sept. 30, Oct. 21, Nov. 26, 1915; Jan. 17, Feb. 18, Mar. 25, May 26, 1916.
LONIES.............	23	July 3, 10, 17, 24, 31, Aug. 7, 14, 21, 28, Sept. 4, 11, 18, 25, Oct. 9, 16, 23, 30, Nov. 6, 13, 20, 30, Dec. 4, 11, 18, 1915; Jan. 28, Feb. 8, 16, 25, Mar. 8, 20, Apr. 1, 10, 18, May 2, June 5, 16, 1916.
IANA..............	7	July 20, Aug. 20, Nov. 19, 1915; Feb. 5, Mar. 24, 1916.
....	24	Aug. 10, Oct. 23, Dec. 10, 1915; Feb. 25, Mar. 28, June 2, 1916.
....	23	July 21, Aug. 20, Oct. 4, Nov. 4, Dec. 3, 1915; Feb. 1, Mar. 2, Apr. 4, May 4, 1916.
....	53	July 14, Aug. 12, Sept. 24, Oct. 19, Nov. 27, Dec. 15, 1915; Jan. 8, 31, Feb. 23, Mar. 8, 24, Apr. 4, 7, 13, May 6, 1916.

Consignments of exchanges for foreign countries—Continued.

Country.	Number of boxes.	Date of transmission.
Colombia	11	July 16, Oct. 1, Nov. 12, Dec. 13, 1915.
Costa Rica	12	July 16, Oct. 2, Nov. 12, Dec. 13, 1915; Feb. 2, Mar. 3, Apr. 5, 1916.
Cuba	6	Aug. 10, Oct. 23, Dec. 10, 1915; Feb. 25, Mar. 28, June 2, 1916.
Denmark	33	July 2, Aug. 3, Sept. 9, Oct. 9, 28, Nov. 16, 30, 1915; Jan. 16, Mar. 17, June 10, 1916.
Ecuador	8	July 16, Aug. 17, Oct. 2, Nov. 12, Dec. 14, 1915; Mar. 4, Apr. 7, 1916.
Egypt	10	July 28, Aug. 24, Oct. 6, Nov. 9, Dec. 8, 1915; Feb. 5, May 26, 1916.
France	154	July 14, 29, Aug. 16, 25, Sept. 25, Oct. 14, Nov. 2, 19, Dec. 4, 1915; Jan. 28, Feb. 12, Mar. 14, Apr. 14, May 25, 1916.
Germany	137	Aug. 14, 1915; Jan. 19, June 9, 1916.
Great Britain and Ireland	392	July 3, 10, 17, 24, 31, Aug. 7, 14, 21, 28, Sept. 4, 11, 18, 25, Oct. 9, 16, 23, Nov. 6, 13, 20, 30, Dec. 4, 11, 18, 1915; Jan. 20, 28, Feb. 8, 16, 25, Mar. 8, 20, Apr. 1, 10, 17, May 2, June 5, 1916.
Greece	9	July 28, Aug. 28, Oct. 6, Nov. 12, Dec. 11, 1915; Jan. 25, 1916.
Guatemala	6	July 20, Oct. 6, Nov. 16, Dec. 14, 1915; Mar. 4, Apr. 6, 1916.
Haiti	6	Aug. 10, Oct. 23, Dec. 10, 1915; Feb. 25, Mar. 28, June 2, 1916.
Honduras	4	July 20, Oct. 6, 1915; Feb. 3, Apr. 6, 1916.
India	54	July 10, 17, 24, 31, Aug. 7, 14, 21, 28, Sept. 4, 11, 25, Oct. 9, 16, 23, 30, Nov. 6, 13, 20, 30, Dec. 4, 11, 18, 1915; Jan. 28, Feb. 8, 16, 25, Mar. 8, 20, Apr. 1, 10, 17, May 2, June 5, 16, 1916.
Italy	94	July 13, Aug. 25, Sept. 25, Oct. 13, Nov. 2, 18, Dec. 6, 1915; Jan. 21, Feb. 12, Mar. 14, Apr. 12, May 25, 1916.
Jamaica	6	July 29, Sept. 28, Nov. 5, Dec. 15, 1915; Feb. 4, Apr. 7, 1916.
Japan	50	July 5, Aug. 3, Sept. 11, Oct. 9, Nov. 9, Dec. 9, 1915; Jan. 29, Feb. 29, Mar. 29, Apr. 29, 1916.
Korea	3	July 28, Sept. 28, Oct. 23, 1915.
Liberia	3	July 29, Sept. 28, Dec. 15, 1915.
Lourenço Marquez	1	July 28, 1915.
Mexico	6	Aug. 10, Oct. 23, Dec. 10, 1915; Feb. 25, Mar. 28, June 2, 1916.
Netherlands	46	July 15, 27, Aug. 14, 17, 25, Sept. 28, Oct. 13, Nov. 3, Dec. 2, 1915; Jan. 21, Feb. 21, Apr. 1, May 2, 1916.
New South Wales	34	July 8, Aug. 10, Sept. 23, Oct. 20, Nov. 23, 1915; Jan. 14, Feb. 14, Mar. 15, Apr. 20, 1916.
New Zealand	28	July 13, Aug. 12, Sept. 24, Oct. 20, Nov. 23, 1915; Jan. 15, Feb. 14, Mar. 15, Apr. 21, 1916.
Nicaragua	4	July 20, Oct. 6, Nov. 16, 1915; Apr. 6, 1916.
Norway	26	July 2, Aug. 3, Sept. 9, Oct. 9, Nov. 9, Dec. 8, 1915; Jan. 25, Mar. 7, Apr. 17, 1916.
Paraguay	7	July 29, Oct. 2, Nov. 16, Dec. 14, 1915; Feb. 3, Apr. 7, 1916.
Peru	30	July 21, Aug. 20, Oct. 4, Dec. 3, 1915; Feb. 1, Mar. 2, Apr. 4, May 4, 1916.
Portugal	20	July 2, Aug. 3, Sept. 9, Oct. 9, Nov. 9, Dec. 8, 1915; Jan. 25, Mar. 7, Apr. 11, June 16, 1916.
Queensland	16	July 2, Aug. 12, Sept. 24. Oct. 20, Nov. 23, 1915; Jan. 15, Feb. 14, Mar. 15, Apr. 21, 1916.
Salvador	6	July 20, Oct. 6, Nov. 16, Dec. 14, 1915; Mar. 4, Apr. 6, 1916.
Siam	5	July 28, Sept. 28, Dec. 7, 1915; Apr. 7, Feb. 4, 1916.
South Australia	24	July 8, Aug. 10, Sept. 23, Oct. 20, Nov. 23, 1915; Jan. 14, Feb. 14, Mar. 15, Apr. 20, 1916.
Spain	40	July 7, Aug. 10, Sept. 22, Oct. 19, Dec. 2, 1915; Jan. 21, Feb. 21, Mar. 29, Apr, 28, June 10, 1916.

Consignments of exchanges for foreign countries—Continued.

Country.	Number of boxes.	Date of transmission.
N	49	July 27, Aug. 24, Sept. 15, Oct. 18, Nov. 24, 1915; Jan. 15, Feb. 17, Mar. 17, Apr. 22, 1916.
ERLAND	50	Sept. 24, Oct. 13, Nov. 3, Dec. 3, 1915; Jan. 15, Feb. 18, Mar. 24, Apr. 24, June 8, 1916.
NIA	20	July 3, 10, 17, 24, 31, Aug. 7, 14, 21, 28, Sept. 4, 11, 18, 25, Oct. 9, 16, 30, Nov. 6, 13, 20, 30, Dec. 4, 11, 18 1915; Jan. 28, Feb. 8, 16, 25, Mar. 8, 20, Apr. 1, 10, 18, May 2, June 5, 16, 1916.
DAD	3	July 29, Sept. 28, Dec. 15, 1915.
OF SOUTH AFRICA	34	July 27, Aug. 25, Nov. 5, Dec. 6, 1915; Feb. 5, Mar. 8, Apr. 11, 1916,
JAY	17	July 21, Aug. 20, Oct. 4, Nov. 12, Dec. 13, 1915; Feb. 2, Mar. 3. Apr. 5, 1916.
UELA	13	July 16, Oct. 2, Nov. 12, Dec. 13, 1915; Feb. 2, Mar. 8, Apr. 5, 1916.
RIA	35	July 8, Aug. 10, 19, Sept. 23, Oct. 20, Nov. 23, 1915; Jan. 14, Feb. 14, Mar. 15, Apr. 20, 1916.
ERN AUSTRALIA	20	July 3, 10, 17, 24, 31, Aug. 7, 14, 21, 28, Sept. 4, 11, 18, 25, Oct. 9, 16, 23, 30, Nov. 6, 13, 20, 30, Dec. 4, 11, 18, 1915; Jan. 28, Feb. 8, 16, 25, Mar. 8, 20, Apr. 1, 10, 18, May 2, June 5, 16, 1916.
WARD AND LEEWARD NDS.	2	July 29, Sept. 28, 1915,

EIGN DEPOSITORIES OF UNITED STATES GOVERNMENTAL DOCUMENTS.

he number of sets of the United States official publications regu-
 forwarded to foreign countries in accordance with treaty stipu-
ns and under the authority of the congressional resolutions of
ch 2, 1867, and March 2, 1901, has been reduced from 92 to 91—
series sent to the Government of Bombay having been discon-
ed at the latter's request. In asking that these shipments be dis-
inued, the secretary to the Government of Bombay stated that
ould in no way affect the transmission of the reports of his
ernment for deposit in the Library of Congress.

he recipients of the 55 full and 36 partial sets are as follows:

DEPOSITORIES OF FULL SETS.

NTINA: Ministerio de Relaciones Exteriores, Buenos Aires.

RALIA: Library of the Commonwealth Parliament, Melbourne.

RIA: K. K. Statistische Zentral-Kommission, Vienna.

N: Universitäts-Bibliothek, Freiburg. (Depository of the Grand Duchy Baden.)

RIA: Königliche Hof- und Staats-Bibliothek, Munich.

IUM: Bibliothèque Royale, Brussels.

IL: Bibliotheca Nacional, Rio de Janeiro.

NOS AIRES: Biblioteca de la Universidad Nacional de La Plata. (Deposiry of the Province of Buenos Aires.)

ADA: Library of Parliament, Ottawa.

Chile: Biblioteca del Congreso Nacional, Santiago.
China: American-Chinese Publication Exchange Department, Shanghai Bureau of Foreign Affairs, Shanghai.
Colombia: Biblioteca Nacional, Bogotá.
Costa Rica: Oficina de Depósito y Canje Internacional de Publicaciones, San José.
Cuba: Secretaria de Estado (Asuntos Generales y Canje Internacional), Habana.
Denmark: Kongelige Bibliotheket, Copenhagen.
England: British Museum, London.
France: Bibliothèque Nationale, Paris.
Germany: Deutsche Reichstags-Bibliothek, Berlin.
Glasgow: City Librarian, Mitchell Library, Glasgow.
Greece: Bibliothèque Nationale, Athens.
Haiti: Secrétaire d'État des Relations Extérieures, Port au Prince.
Hungary: Hungarian House of Delegates, Budapest.
India: Department of Education (Books), Government of India, Calcutta.
Ireland: National Library of Ireland, Dublin.
Italy: Biblioteca Nazionale Vittorio Emanuele, Rome.
Japan: Imperial Library of Japan, Tokyo.
London: London School of Economics and Political Science. (Depository of the London County Council.)
Manitoba: Provincial Library, Winnipeg.
Mexico: Instituto Bibliográfico, Biblioteca Nacional, Mexico.
Netherlands: Library of the States General, The Hague.
New South Wales: Public Library of New South Wales, Sydney.
New Zealand: General Assembly Library, Wellington.
Norway: Storthingets Bibliothek, Christiania.
Ontario: Legislative Library, Toronto.
Paris: Préfecture de la Seine.
Peru: Biblioteca Nacional, Lima.
Portugal: Bibliotheca Nacional, Lisbon.
Prussia: Königliche Bibliothek, Berlin.
Quebec: Library of the Legislature of the Province of Quebec, Quebec.
Queensland: Parliamentary Library, Brisbane.
Russia: Imperial Public Library, Petrograd.
Saxony: Königliche Oeffentliche Bibliothek, Dresden.
Serbia: Section Administrative du Ministère des Affaires Étrangères, Belgrade.
South Australia: Parliamentary Library, Adelaide.
Spain: Servicio del Cambio Internacional de Publicaciones, Cuerpo Facultativo de Archiveros, Bibliotecarios y Arqueólogos, Madrid.
Sweden: Kungliga Biblioteket, Stockholm.
Switzerland: Bibliothèque Fédérale, Berne.
Tasmania: Parliamentary Library, Hobart.
Turkey: Department of Public Instruction, Constantinople.
Union of South Africa: State Library, Pretoria, Transvaal.
Uruguay: Oficina de Canje Internacional de Publicaciones, Montevideo.
Venezuela: Biblioteca Nacional, Caracas.
Victoria: Public Library, Melbourne.
Western Australia: Public Library of Western Australia, Perth.
Württemberg: Königliche Landesbibliothek, Stuttgart.

DEPOSITORIES OF PARTIAL SETS.

Provincial Library, Edmonton.
RRAINE: K. Ministerium für Elsass-Lothringen, Strassburg.
Ministerio de Colonización y Agricultura, La Paz.
Senatskommission für Reichs- und Auswärtige Angelegenheiten.
OLUMBIA: Legislative Library, Victoria.
UIANA: Government Secretary's Office, Georgetown, Demerara.
: Minister of Foreign Affairs, Sofia.
Colonial Secretary's Office (Record Department of the Library), Co-

Biblioteca Nacional, Quito.
ibliothèque Khédiviale, Cairo.
Chancery of Governor, Helsingfors.
LA: Secretary of the Government, Guatemala.
: Senatskommission für die Reichs- und Auswärtigen Angelegenheiten.
rossherzogliche Hof-Bibliothek, Darmstadt.
s: Secretary of the Government, Tegucigalpa.
Colonial Secretary, Kingston.
Department of State, Monrovia.
MARQUEZ: Government Library, Lourenço Marquez.
President of the Senate.
PROVINCE OF: Chief Secretary to the Government of Madras, Public
ment, Madras.
ieutenant Governor, Valetta.
RO: Ministère des Affaires Étrangères, Cetinje.
NSWICK: Legislative Library, Fredericton.
DLAND: Colonial Secretary, St. Johns.
A: Superintendente de Archivos Nacionales, Managua.
ST TERRITORIES: Government Library, Regina.
TIA: Provincial Secretary of Nova Scotia, Halifax.
Secretaria de Relaciones Exteriores, Panama.
: Oficina General de Inmigracion, Asuncion.
DWARD ISLAND: Legislative Library, Charlottetown.
A: Academia Romana, Bucharest.
: Ministerio de Relaciones Exteriores, San Salvador.
partment of Foreign Affairs, Bangkok.
SETTLEMENTS: Colonial Secretary, Singapore.
ROVINCES OF AGRA AND OUDH: Under Secretary to Government, Alla-

Bürgermeister der Haupt- und Residenz-Stadt.

RPARLIAMENTRY EXCHANGE OF OFFICIAL JOURNALS.

overnments of Bolivia, Peru, and Venezuela were added to untries with which the immediate exchange of official parlia- journals is carried on. Following is a complete list of the nents to which the Congressional Record is now sent:

Republic.
Bolivia.
Brazil.
Buenos Aires, Province of.
Canada.
Costa Rica.

Cuba.
Denmark.
France.
Great Britain.
Greece.
Guatemala.
Honduras.
Hungary.
Italy.
Liberia.
New South Wales.
New Zealand.
Peru.
Portugal.
Prussia.
Queensland.
Roumania.
Russia.
Serbia.
Spain.
Switzerland.
Transvaal.
Union of South Africa.
Uruguay.
Venezuela.
Western Australia.

It will therefore be seen that there are now 36 countries with which this exchange is conducted. To some of these countries two copies of the Congressional Record are sent—one to the Upper and one to the Lower House of Parliament—the total number transmitted being 41.

LIST OF BUREAUS OR AGENCIES THROUGH WHICH EXCHANGES ARE TRANSMITTED.

The following is a list of the bureaus or agencies through which exchanges are transmitted:

Algeria, *via* France.

Angola, *via* Portugal.

Argentina: Comisión Protectora de Bibliotecas Populares, Santa Fé 880, Buenos Aires.

Austria: K. K. Statistische Zentral-Kommission, Vienna.

Azores, *via* Portugal.

Belgium: Service Belge des Échanges Internationaux, Rue des Longs-Chariots 46, Brussels.

Bolivia: Oficina Nacional de Estadística, La Paz.

Brazil: Serviço de Permutações Internacionaes, Bibliotheca Nacional, Rio de Janeiro.

British Colonies: Crown Agents for the Colonies, London.

British Guiana: Royal Agricultural and Commercial Society, Georgetown.

British Honduras: Colonial Secretary, Belize.

Bulgaria: Institutions Scientifiques de S. M. le Roi de Bulgarie, Sofia.

Canary Islands, *via* Spain.

Chile: Servicio de Canjes Internacionales, Biblioteca Nacional, Santiago.

China: American-Chinese Publication Exchange Department, Shanghai Bureau of Foreign Affairs, Shanghai.

Colombia: Oficina de Canjes Internacionales y Reparto, Biblioteca Nacional, Bogotá.

Costa Rica: Oficina de Depósito y Canje Internacional de Publicaciones, San José.

Denmark: Kongelige Danske Videnskabernes Selskab, Copenhagen.

Dutch Guiana: Surinaamsche Koloniale Bibliotheek, Paramaribo.

Ecuador: Ministerio de Relaciones Exteriores, Quito.

Egypt: Government Publications Office, Printing Department, Cairo.

France: Service Français des Échanges Internationaux, 110 Rue de Grenelle, Paris.

GERMANY: Amerika-Institut, Berlin, N. W. 7.

GREAT BRITAIN AND IRELAND: Messrs. William Wesley & Son, 28 Essex Street, Strand, London.

GREECE: Bibliothèque Nationale, Athens.

GREENLAND, *via* Denmark.

GUADELOUPE, *via* France.

GUATEMALA: Instituto Nacional de Varones, Guatemala.

GUINEA, *via* Portugal.

HAITI: Secrétaire d'État des Relations Extérieures, Port au Prince.

HONDURAS: Biblioteca Nacional, Tegucigalpa.

HUNGARY: Dr. Julius Pikler, Municipal Office of Statistics, Váci-utca 80, Budapest.

ICELAND, *via* Denmark.

INDIA: India Store Department, India Office, London.

ITALY: Ufficio degli Scambi Internazionali, Biblioteca Nazionale Vittorio Emanuele, Rome.

JAMAICA: Institute of Jamaica, Kingston.

JAPAN: Imperial Library of Japan, Tokyo.

JAVA, *via* Netherlands.

KOREA: Government General, Keijo.

LIBERIA: Bureau of Exchanges, Department of State, Monrovia.

LOURENÇO MARQUEZ: Government Library, Lourenço Marquez.

LUXEMBURG, *via* Germany.

MADAGASCAR, *via* France.

MADEIRA, *via* Portugal.

MONTENEGRO: Ministère des Affaires Étrangères, Cetinje.

MOZAMBIQUE, *via* Portugal.

NETHERLANDS: Bureau Scientifique Central Néerlandais, Bibliothèque de l'Université, Leyden.

NEW GUINEA, *via* Netherlands.

NEW SOUTH WALES: Public Library of New South Wales, Sydney.

NEW ZEALAND: Dominion Museum, Wellington.

NICARAGUA: Ministerio de Relaciones Exteriores, Managua.

NORWAY: Kongelige Norske Frederiks Universitet Bibliotheket, Christiania.

PANAMA: Secretaria de Relaciones Exteriores, Panama.

PARAGUAY: Servicio de Canje Internacional de Publicaciones, Sección Consular y de Comercio, Ministerio de Relaciones Exteriores, Asuncion.

PERSIA: Board of Foreign Missions of the Presbyterian Church, New York City.

PERU: Oficina de Reparto, Depósito y Canje Internacional de Publicaciones, Ministerio de Fomento, Lima.

PORTUGAL: Serviço de Permutações Internacionaes, Inspecção Geral das Bibliothecas e Archivos Publicos, Lisbon.

QUEENSLAND: Bureau of Exchanges of International Publications, Chief Secretary's Office, Brisbane.

ROUMANIA: Academia Romana, Bucharest.

RUSSIA: Commission Russe des Échanges Internationaux, Bibliothèque Imperiale Publique, Petrograd.

SALVADOR: Ministerio de Relaciones Exteriores, San Salvador.

SERBIA: Section Administrative du Ministère des Affaires Étrangères, Belgrade.

SIAM: Department of Foreign Affairs, Bangkok.

SOUTH AUSTRALIA: Public Library of South Australia, Adelaide.

SPAIN: Servicio del Cambio Internacional de Publicaciones, Cuerpo Facultativo de Archiveros, Bibliotecarios y Arqueólogos, Madrid.

SUMATRA, *via* Netherlands.
SWEDEN: Kongliga Svenska Vetenskaps Akademien, Stockholm.
SWITZERLAND: Service des Échanges Internationaux, Bibliothèque Fédérale Centrale, Berne.
SYRIA: Board of Foreign Missions of the Presbyterian Church, New York.
TASMANIA: Secretary to the Premier, Hobart.
TRINIDAD: Royal Victoria Institute of Trinidad and Tobago, Port-of-Spain.
TUNIS, *via* France.
TURKEY: American Board of Commissioners for Foreign Missions, Boston.
UNION OF SOUTH AFRICA: Government Printing Works, Pretoria, Transvaal.
URUGUAY: Oficina de Canje Internacional, Montevideo.
VENEZUELA: Biblioteca Nacional, Caracas.
VICTORIA: Public Library of Victoria, Melbourne.
WESTERN AUSTRALIA: Public Library of Western Australia, Perth.
WINDWARD AND LEEWARD ISLANDS: Imperial Department of Agriculture, Bridgetown, Barbados.

Respectfully submitted.

C. W. SHOEMAKER,
Chief Clerk, International Exchange Service.

DR. CHARLES D. WALCOTT,
Secretary of the Smithsonian Institution.
AUGUST 23, 1916.

APPENDIX 4.

N THE NATIONAL ZOOLOGICAL PARK.

he honor to present below a report concerning the
e National Zoological Park for the fiscal year ending

owed by Congress the sum of $100,000 for all pur-
inting, for which $200 additional was granted.
war has had a marked effect upon the cost of living
nly are the prices higher, but transportation is more
refore more expensive. Many of the regular dealers
d to withdraw from the business. Notwithstanding
the National Zoological Park has maintained its col-
ell, and remains at about the same level in numbers
here are, indeed, some 15 species in the park not pre-
d here. A careful estimate of the value of the ani-
ection shows that it must be at least $90,000, at the
et prices. The value of the buildings is estimated

ACCESSIONS.

number, included 5 American bison, deer of 11 species,
American tapir, a Bactrian camel, 2 monkeys, some
and a few birds.
nost important of these was four elands and four
ceived from the Duke of Bedford at Woburn Abbey,
e fawns were born from the deer during their transit.
st of the donors and gifts is as follows:

lerson, jr., Tucson, Ariz., a desert lynx.
lerson, Washington, D. C., a common canary.
ıby, Washington, D. C., a barred owl.
rd, Clearwater, Fla., two barred owls.
dford, Woburn Abbey, England, four elands and four Kash-

gical Survey, an American marten.
ows, Washington, D. C., two alligators.
usi, Washington, D. C., an alligator.
ooper, Washington, D. C., a tarantula.
Washington, D. C., a great horned owl.
ıs, Washington, D. C., two raccoons.
, Washington, D. C., a copperhead snake.

Mr. Victor J. Evans, Washington, D. C., three marmosettes.

Mr. George Field, Washington, D. C., a Texan armadillo.

Mr. Marcus A. Hanna, Washington, D. C., a copperhead snake.

Mr. G. M. Haynes, Washington, D. C., an alligator.

Mr. Ross Hazeltine, United States Consular Service, an ocelot.

Mrs. Mary F. Henderson, Washington, D. C., two grass parrakeets and a canary.

Mrs. Robert Hitt, Washington, D. C., a bare-eyed cockatoo.

Mr. G. C. Hogan, Comorn, Va., a gray fox.

Mr. George Howell, Washington, D. C., two alligators.

Mr. R. C. Huey, Hot Springs, Ark., a dusky wolf.

Miss Juergens, Washington, D. C., an alligator.

Miss Annie Lee Knight, Washington, D. C., a gray fox.

Mr. J. C. Lamon, Knoxville, Tenn., a black snake.

Mr. T. P. Lovering, Washington, D. C., a king snake.

Mr. S. Lyons, Washington, D. C., two alligators.

Mr. Vinson McLean, Washington, D. C., a gray parrot, a macaw, and a great red-crested cockatoo.

Mr. Lee S. Page, Washington, D. C., an alligator.

Hon. Frank Park, M. C., Sylvester, Ga., at request of late Senator Bacon, three fox squirrels.

Mr. Robert Portner, Washington, D. C., an alligator.

Mr. C. S. Rockwood, Washington, D. C., an alligator.

Mr. Baynard Schindel, Washington, D. C., an alligator.

Dr. R. W. Shufeldt, Washington, D. C., a black snake.

Mr. J. H. Steig, Washington, D. C., a black snake.

Dr. J. R. Stewart, Washington, D. C., a woodchuck.

Mrs. F. H. Talkes, Washington, D. C., a parrot.

Mrs. R. B. Tingsley, Washington, D. C., an alligator.

Mr. C. V. R. Townsend, Munising, Mich., a coyote.

Hon. Woodrow Wilson, Washington, D. C., two bald eagles.

Unknown donor, an alligator.

Unknown donor, two cardinals, one common mocking bird, one brown thrasher.

Exchanges.—The possession of a considerable number of surplus animals made it possible for the park to profit by 187 exchanges. Among the important acquisitions were a pair of young lions from the Department of Parks, New York City, a male guanaco from the Philadelphia Zoological Garden, a chimpanzee, a fine pair of Siberian tigers, a nilgai, a pair of mule deer, a pair of Columbian black-tailed deer, a great red kangaroo, several monkeys and other mammals, a secretary vulture, and a considerable number of other birds.

The chimpanzee was new to the collection and is a very intelligent and interesting male about 4½ years old, from the forests of French Congo. He is an object of great interest to the public and attracts much attention every day, especially when at his meals, as he has been taught to sit in a chair at a table, eat with a fork and drink out of a glass. As there was no conveniently available cage for him in the monkey house, special quarters have been provided in the lion house, in a corner where he is shielded from drafts of air. In

er to prevent feeding by visitors a glass screen was erected be-
en this cage and the public space. Pure air is provided by a duct
ling from the outside of the building suitably warmed by a heat-
coil. He has made himself entirely at home there, appears happy,
tented, and quite healthy. A larger, more spacious cage will be
structed for occupation during hot weather, where he can be more
isfactorily seen.

rom Yellowstone National Park.—Two black timber wolves, in-
esting from their rarity, were transferred from the Yellowstone
rk.

aptured.—A raccoon, possibly a wild one, but more probably one
it had escaped, was caught in a trap.

Loaned.—3 mink and 7 martens were temporarily loaned, also 1
nkey and a parrot.

LOSSES.

Among the most important losses was that of the young male
frican elephant, Jumbo II, a beautiful, active animal that was
ught from the Government Zoological Garden at Giza, Egypt, in
13. He was then about 4 years old. The death of this valuable
imal was entirely unexpected, as he had always seemed in ex-
llent health. A post-mortem examination, made by veterinarians
om the Bureau of Animal Industry, revealed a rupture of the
mach, a tear 7 inches in length occurring along the great
rvature. Escape of the stomach contents had caused an acute
ritonitis. The cause of this rupture is quite obscure. The diet of
e animal had not been changed either in quantity or quality, and
e stomach had not been overdistended by food. Nor did an ex-
aination of the discharged material reveal any substances that
ight have occasioned an active fermentation with considerable evolu-
n of gas. The other viscera showed no gross pathologic changes.

Other losses were a male lion, from softening of the brain, a fur
al, a male California sea lion, a black leopard, from old age, a male
merican bison, from pneumonia, a male and female nilgai, from
neralized tuberculosis; 38 animals were lost from attacks by cage
ates, by dogs (directly or indirectly), or through other accidents.
mebic dysentery attacked some spider monkeys, recently received,
id caused the death of six of these animals. Post-mortem examina-
ns were made, as usual, by the Pathological Division of the Bureau
Animal Industry, Department of Agriculture.[1]

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[1] The causes of death were reported to be as follows: Enteritis, 24; gastroenteritis, 4;
ebic dysentery, 6; fermentation colic, 1; intestinal coccidiosis, 1; cercomoniasis, 1;
eumonia, 15; tuberculosis, 14; congestion of lungs, 3; pulmonary edema, 1; asthma,
aspergillosis, 4; pyemia, 3; septicemia, 1; toxemia, 1; pericarditis, 1; hepatitis, 3;
tty degeneration of kidneys, 1; gangrene of cecum, 1; necrosis of rectum, 1; softening
brain, 1; hematoma of liver, 1; tumor, 1; anemia, 2; rupture of stomach, 1; no suffi-
nt cause found, 17; not fit for examination, 3.

ANIMALS IN THE COLLECTION JUNE 30, 1916.

MAMMALS.

Chimpanzee (*Pan troglodytes*)	1
Mona monkey (*Cercopithecus mona*)	3
Patas monkey (*Cercopithecus patas*)	2
Diana monkey (*Cercopithecus diana*)	1
Bonnet monkey (*Macacus sinicus*)	1
Macaque monkey (*Macacus cynomolgus*)	2
Pig-tailed monkey (*Macacus nemestrinus*)	3
Rhesus monkey (*Macacus rhesus*)	29
Brown macaque (*Macacus arctoides*)	2
Japanese monkey (*Macacus fuscatus*)	3
Moor macaque (*Macacus maurus*)	1
Chacma (*Papio porcarius*)	1
Guinea baboon (*Papio papio*)	4
Yellow baboon (*Papio cynocephalus*)	1
Hamadryas baboon (*Papio hamadryas*)	2
Mandrill (*Papio sphinx*)	1
White-throated capuchin (*Cebus hypoleucus*)	2
Brown capuchin (*Cebus fatuellus*)	1
Gray spider-monkey (*Ateles geoffroyi*)	5
Marmosette (*Hapale jacchus*)	3
Mongoose lemur (*Lemur mongoz*)	1
Black lemur (*Lemur macaco*)	1
Polar bear (*Thalarctos maritimus*)	2
European brown bear (*Ursus arctos*)	2
Kadiak bear (*Ursus middendorffi*)	1
Yakutat bear (*Ursus dalli*)	1
Alaskan brown bear (*Ursus gyas*)	2
Kidder's bear (*Ursus kidderi*)	2
Hybrid bear (*Ursus kidderi-arctos*)	2
Himalayan bear (*Ursus thibetanus*)	1
Japanese bear (*Ursus japonicus*)	1
Grizzly bear (*Ursus horribilis*)	3
Black bear (*Ursus americanus*)	6
Cinnamon bear (*Ursus americanus*)	2
Sloth bear (*Melursus ursinus*)	1
Kinkajou (*Cercoleptes caudivolvulus*)	1
Cacomistle (*Bassariscus astuta*)	1
Gray coatimundi (*Nasua narica*)	4
Raccoon (*Procyon lotor*)	13
American badger (*Taxidea taxus*)	2
European badger (*Meles taxus*)	2
Common skunk (*Mephitis putida*)	2
Tayra (*Galictis barbara*)	1
American marten (*Mustela americana*)	9
Fisher (*Mustela pennantii*)	1
Mink (*Putorius vison*)	8
Common ferret (*Putorius putorius*)	1
North American otter (*Lutra canadensis*)	5
Eskimo dog (*Canis familiaris*)	4
Dingo (*Canis dingo*)	1
Gray wolf (*Canis occidentalis*)	6
Dusky wolf (*Canis nubilus*)	1
Coyote (*Canis latrans*)	3
Woodhouse's coyote (*Canis frustror*)	2
Red fox (*Vulpes pennsylvanicus*)	4
Swift fox (*Vulpes velox*)	1
Arctic fox (*Vulpes lagopus*)	1
Gray fox (*Urocyon cinereo-argenteus*)	5
Spotted hyena (*Hyæna crocuta*)	1
African civet (*Viverra civetta*)	1
Common genet (*Genetta genetta*)	1
Cheetah (*Cynailurus jubatus*)	2
Sudan lion (*Felis leo*)	5
Bengal tiger (*Felis tigris*)	2
Siberian tiger (*Felis tigris longipilis*)	2
Puma (*Felis oregonensis hippolestes*)	4
Jaguar (*Felis onca*)	1
Leopard (*Felis pardus*)	8
Ocelot (*Felis pardalis*)	1
Canada lynx (*Lynx canadensis*)	3
Bay lynx (*Lynx rufus*)	7
Spotted lynx (*Lynx rufus texensis*)	2
California lynx (*Lynx rufus californicus*)	1
Florida lynx (*Lynx rufus floridanus*)	1
Steller's sea lion (*Eumetopias stelleri*)	1
California sea lion (*Zalophus californianus*)	1
Harbor seal (*Phoca vitulina*)	1
Fox squirrel (*Sciurus niger*)	9
Western fox squirrel (*Sciurus ludovicianus*)	11
Gray squirrel (*Sciurus carolinensis*)	40
Black squirrel (*Sciurus carolinensis*)	20
Albino squirrel (*Sciurus carolinensis*)	1
Thirteen-lined spermophile (*Spermophilus tridecimlineatus*)	2
Prairie dog (*Cyomys ludovicianus*)	9
Woodchuck (*Marmota monax*)	1
American beaver (*Castor canadensis*)	2
Coypu (*Myocastor coypus*)	2
European porcupine (*Hystrix cristata*)	3
Indian porcupine (*Hystrix leucura*)	1
Viscacha (*Lagostomus trichodactylus*)	1
Mexican agouti (*Dasyprocta mexicana*)	1
Azara's agouti (*Dasyprocta azaræ*)	1
Crested agouti (*Dasyprocta cristata*)	2
Hairy-rumped agouti (*Dasyprocta prymnolopha*)	4
Paca (*Cœlogenys paca*)	2
Guinea pig (*Cavia cutleri*)	13
Patagonian cavy (*Dolichotis patagonica*)	2
Cottontail rabbit (*Lepus sylvaticus*)	2
Domestic rabbit (*Lepus cuniculus*)	15
African elephant (*Elephas oxyotis*)	1
Indian elephant (*Elephas maximus*)	1
Brazilian tapir (*Tapirus americanus*)	4
Mongolian horse (*Equus przewalskii*)	1
Grevy's zebra (*Equus grevyi*)	2
Zebra-horse hybrid (*Equus grevyi-caballus*)	1
Zebra-donkey hybrid (*Equus grevyi-asinus*)	1
Grant's zebra (*Equus burchelli granti*)	1
Collared peccary (*Dicotyles angulatus*)	2
Wild boar (*Sus scrofa*)	1
Northern wart-hog (*Phacochærus africanus*)	2
Hippopotamus (*Hippopotamus amphibius*)	2
Guanaco (*Lama huanachus*)	8
Llama (*Lama glama*)	8
Alpaca (*Lama pacos*)	2
Vicugna (*Lama vicugna*)	1
Bactrian camel (*Camelus bactrianus*)	8
Arabian camel (*Camelus dromedarius*)	4
Sambar deer (*Cervus unicolor*)	2
Philippine deer (*Cervus philippinus*)	1
Hog deer (*Cervus porcinus*)	9
Barasingha deer (*Cervus duvaucelii*)	13
Axis deer (*Cervus axis*)	8
Japanese deer (*Cervus sika*)	6
Kashmir deer (*Cervus cashmirianus*)	7
Red deer (*Cervus elaphus*)	10
American elk (*Cervus canadensis*)	8
Fallow deer (*Cervus dama*)	7
Virginia deer (*Odocoileus virginianus*)	13
Mule deer (*Odocoileus hemionus*)	4
Columbian black-tailed deer (*Odocoileus columbianus*)	5
Cuban deer (*Odocoileus sp.*)	1
Blessbok (*Damaliscus albifrons*)	1
White-tailed gnu (*Connochætes gnu*)	1
Defassa water buck (*Cobus defassa*)	1
Indian antelope (*Antilope cervicapra*)	4
Arabian gazelle (*Gazella arabica*)	2
Sable antelope (*Hippotragus niger*)	1
Nilgai (*Boselaphus tragocamelus*)	2
Congo harnessed antelope (*Tragelaphus gratus*)	2
Eland (*Taurotragus oryx livingstonii*)	4

itragus jemlaicus)	3
goat (*Capra hircus*)	4
eep (*Ovis tragelaphus*)	12
sheep (*Ovis aries-tragela-*	8
a depressicornis)	1
s indicus)	2
agus grunniens)	4
ison (*Bison americanus*)	17
dillo (*Dasypus villosus*)	3

Great gray kangaroo (*Macropus giganteus*)	1
Wallaroo (*Macropus robustus*)	2
Red kangaroo (*Macropus rufus*)	3
Bennett's wallaby (*Macropus ruficollis bennetti*)	1
Phalanger (*Trichosurus vulpecula*)	2
Virginia opossum (*Didelphys marsupialis*)	1

BIRDS.

rd (*Mimus polyglottos*)	1
umetella carolinensis)	1
asher (*Toxostoma rufum*)	1
obin (*Liothrix luteus*)	5
thrush (*Garrulax leuco-*	2
gray jumper (*Struthidea*	2
h (*Tanagra episcopus*)	4
finch (*Amadina fasciata*)	2
(*Amadina castanotis*)	4
d finch (*Munia atrica-*	4
ed finch (*Munia malacca*)	6
ed finch (*Munia maja*)	9
ch (*Munia punctularia*)	6
ow (*Munia oryzivora*)	12
a sparrow (*Munia ory-*	14
Gouldian finch (*Poëphila*	2
Gouldian finch (*Poëphila*)	2
l grass finch (*Poëphila a*)	1
easted finch (*Donacola horax*)	6
eaver (*Pyromelana afra*)	4
weaver (*Foudia madagas-*)	4
weaver (*Quelea quelea*)	8
eaver (*Vidua paradisea*)	8
cardinal (*Paroaria cucul-*	2
ardinal (*Cardinalis cardi-*	4
h (*Sycalis flaveola*)	15
mer (*Emberiza citrinella*)	1
nary (*Serinus canarius*)	7
olothrus ater)	1
ling (*Lamprotornis cauda-*	1
aven (*Corvus corax*)	1
crow (*Corvus coronoides*)	1
ted jay (*Garrulus leuco-*	1
Cyanocitta cristata)	1
magpie (*Pica pica hud-*	3
magpie (*Urocissa occipi-*	1
ant (*Pitangus sulphuratus s*)	1
isher (*Dacelo gigas*)	2
qued hornbill (*Dichoceros*	1
otmot (*Momotus subrufes-*	1
sted lory	1
tain lory (*Trichoglossus andiæ*)	8
ted lorikeet (*Psitteuteles idotus*)	7
sted cockatoo (*Cacatua*	3
atoo (*Cacatua alba*)	3
crested cockatoo (*Cacatua sis*)	1
s cockatoo (*Cacatua lead-*	1
cockatoo (*Cacatua gym-*	3

Roseate cockatoo (*Cacatua roseicapilla*)	12
Yellow and blue macaw (*Ara ararauna*)	2
Red and yellow and blue macaw (*Ara macao*)	7
Red and blue macaw (*Ara chloroptera*)	2
Gray-breasted parrakeet (*Myopsittacus monachus*)	1
Cuban parrot (*Amazona leucocephala*)	1
Festive amazon (*Amazona festiva*)	1
Porto Rican amazon (*Amazona vittata*)	1
Yellow-shouldered amazon (*Amazona ochroptera*)	2
Yellow-fronted amazon (*Amazona ochrocephala*)	2
Yellow-naped amazon (*Amazona auripalliata*)	2
Yellow-headed amazon (*Amazona levaillanti*)	2
Blue-fronted amazon (*Amazona æstiva*)	1
Gray parrot (*Psittacus erythacus*)	1
Lesser vasa parrot (*Coracopsis nigra*)	1
Banded parrakeet (*Palæornis fasciata*)	1
Love bird (*Agapornis pullaria*)	1
Shell parrakeet (*Melopsittacus undulatus*)	6
Great horned owl (*Bubo virginianus*)	14
Arctic horned owl (*Bubo virginianus subarcticus*)	1
Barred owl (*Strix varia*)	4
Sparrow hawk (*Falco sparverius*)	2
Bald eagle (*Haliæetus leucocephalus*)	15
Alaskan bald eagle (*Haliæetus leucocephalus alascanus*)	1
Golden eagle (*Aquila chrysaëtos*)	2
Australian eagle	2
Harpy eagle (*Thrasaëtus harpyia*)	1
Crowned hawk-eagle (*Spizaëtus coronatus*)	1
Cooper's hawk (*Accipiter cooperi*)	1
Venezuelan hawk	1
Caracara (*Polyborus cheriway*)	3
Lammergeyer (*Gypaëtus barbatus*)	1
Secretary vulture (*Gypogeranus secretarius*)	1
South American condor (*Sarcorhamphus gryphus*)	1
California condor (*Gymnogyps californianus*)	3
Griffon vulture (*Gyps fulvus*)	2
Cinereous vulture (*Vultur monachus*)	2
Egyptian vulture (*Neophron percnopterus*)	1
Turkey vulture (*Cathartes aura*)	4
Black vulture (*Catharista urubu*)	2
King vulture (*Gypagus papa*)	2
Snow pigeon (*Columba leuconota*)	2
Red-billed pigeon (*Columba flavirostris*)	4
White-crowned pigeon (*Columba leucocephala*)	2
Band-tailed pigeon (*Columba fasciata*)	4
Mourning dove (*Zenaidura macroura*)	7
Peaceful dove (*Geopelia tranquilla*)	2
Zebra dove (*Geopelia striata*)	22
Collared turtle-dove (*Turtur risorius*)	16
Cape masked dove (*Œna capensis*)	4

Australian crested pigeon (*Ocyphaps lophotes*)	16
Wonga-wonga pigeon (*Leucosarcia picata*)	12
Blue-headed quail-dove (*Starnœnas cyanocephala*)	4
Red-billed curassow (*Crax carunculata*)	1
Mexican curassow (*Crax globicera*)	2
Daubenton's curassow (*Crax daubentoni*)	2
Wild turkey (*Meleagris gallopavo silvestris*)	17
Peafowl (*Pavo cristata*)	69
Peacock pheasant (*Polylectron chinquis*)	1
Silver pheasant (*Euplocamus nycthemerus*)	1
Bobwhite (*Colinus virginianus*)	1
Curaçao crested quail (*Eupsychortyx cristatus*)	3
Scaled quail (*Callipepla squamata*)	1
Valley quail (*Lophortyx californica vallicola*)	2
Gambel's quail (*Lophortyx gambeli*)	1
Massena quail (*Cyrtonyx montezumæ*)	1
American coot (*Fulica americana*)	5
Great bustard (*Otis tarda*)	1
Common cariama (*Cariama cristata*)	1
Demoiselle crane (*Anthropoides virgo*)	7
Crowned crane (*Balearica pavonina*)	2
Whooping crane (*Grus americana*)	1
Sand-hill crane (*Grus mexicana*)	4
Australian crane (*Grus australasiana*)	1
European crane (*Grus cinerea*)	1
Lilford's crane (*Grus lilfordi*)	4
Indian white crane (*Grus leucogeranus*)	2
White-necked crane (*Grus leucauchen*)	1
Ruff (*Machetes pugnax*)	1
Black-crowned night heron (*Nycticorax nycticorax nævius*)	12
Snowy egret (*Egretta candidissima*)	3
Great blue heron (*Ardea herodias*)	1
Great black-crowned heron (*Ardea cocoi*)	1
Boatbill (*Cancroma cochlearia*)	2
Black stork (*Ciconia nigra*)	1
Marabou stork (*Leptoptilus dubius*)	1
Wood ibis (*Mycteria americana*)	1
Sacred ibis (*Ibis æthiopica*)	3
White ibis (*Guara alba*)	12
Roseate spoonbill (*Ajaja ajaja*)	2
European flamingo (*Phœnicopterus roseus*)	2
Black-necked screamer (*Chauna chavaria*)	3
Horned screamer (*Palamedea cornuta*)	1
Whistling swan (*Olor columbianus*)	4
Trumpeter swan (*Olor buccinator*)	2
Mute swan (*Cygnus gibbus*)	5
Black swan (*Chenopis atrata*)	3
Spur-winged goose (*Plectropterus gambensis*)	1
White muscovy duck (*Cairina moschata*)	1

Wood duck (*Aix sponsa*)	6
Mandarin duck (*Dendronessa galericulata*)	27
Cape Barren goose (*Cereopsis novæ hollandiæ*)	2
Lesser snow goose (*Chen hyperboreus*)	8
Greater snow goose (*Chen hyperboreus nivalis*)	1
Blue goose (*Chen cærulescens*)	2
Ross's goose (*Chen rossi*)	1
American white-fronted goose (*Anser albifrons gambeli*)	5
Barred-head goose (*Anser indicus*)	2
Chinese goose (*Anser cygnoides*)	2
Canada goose (*Branta canadensis*)	17
Hutchins's goose (*Branta canadensis hutchinsii*)	6
Cackling goose (*Branta canadensis minima*)	2
Bernicle goose (*Branta leucopsis*)	2
Upland goose (*Chloëphaga magellanica*)	1
White-faced tree duck (*Dendrocygna viduata*)	8
Fulvous tree duck (*Dendrocygna bicolor*)	2
Wandering tree duck (*Dendrocygna arcuata*)	4
Ruddy sheldrake (*Casarca ferruginea*)	1
Mallard (*Anas platyrhynchos*)	5
East Indian black duck (*Anas sp.*)	4
Black duck (*Anas rubripes*)	1
European widgeon (*Mareca penelope*)	1
Pintail (*Dafila acuta*)	2
Blue-winged teal (*Querquedula discors*)	11
Rosy-billed pochard (*Metopiana peposaca*)	1
Red-headed duck (*Marila americana*)	1
American white pelican (*Pelecanus erythrorhynchos*)	9
European white pelican (*Pelecanus onocrotalus*)	2
Roseate pelican (*Pelecanus roseus*)	2
Brown pelican (*Pelecanus occidentalis*)	5
Australian pelican (*Pelecanus conspicillatus*)	2
Florida cormorant (*Phalacrocorax auritus floridanus*)	17
Water turkey (*Anhinga anhinga*)	3
Great black-backed gull (*Larus marinus*)	1
American herring gull (*Larus argentatus smithsonianus*)	2
Laughing gull (*Larus atricilla*)	2
South African ostrich (*Struthio australis*)	4
Somali ostrich (*Struthio molybdophanes*)	1
Common cassowary (*Casuarius galeatus*)	1
Common rhea (*Rhea americana*)	2
Emu (*Dromæus novæ hollandiæ*)	2

REPTILES.

Alligator (*Alligator mississippiensis*)	27
Painted box tortoise (*Cistudo ornata*)	2
Duncan Island tortoise (*Testudo ephippium*)	2
Albemarle Island tortoise (*Testudo vicina*)	1
Gila monster (*Heloderma suspectum*)	3
Regal python (*Python reticulatus*)	3
Common boa (*Boa constrictor*)	4
Anaconda (*Eunectes murinus*)	1

Black snake (*Zamenis constrictor*)	3
Coach-whip snake (*Zamenis flagellum*)	1
Water snake (*Natrix sipedon*)	5
Common garter snake (*Eutænia sirtalis*)	1
Texas water snake (*Eutænia proxima*)	1
King snake (*Ophibolus getulus*)	3
Copperhead (*Ancistrodon contortrix*)	1

STATEMENT OF THE COLLECTION.

ACCESSIONS DURING THE YEAR.

sented	66
chased	105
n and hatched in the National Zoological Park	101
eived in exchange	187
ceived from Yellowstone National Park	2
ptured in National Zoological Park	1
posited in National Zoological Park	12
Total	474

SUMMARY.

imals on hand July 1, 1915	1,397
cesssions during the year	474
	1,871
educt loss (by exchange, death, return of animals, etc.)	488
On hand June 30, 1916	1,383

Class.	Species.	Individuals.
ammals	155	574
irds	189	751
eptiles	16	58
Total	360	1,383

VISITORS.

The number of visitors to the park during the year, as determined y count and estimate, was 1,157,110, a daily average of 3,162. This as the largest year's attendance in the history of the park. The reatest number in any one month was 248,080, in April, 1916, an verage per day of 8,269. The attendance by months was as follows:

1915.—July, 71,900; August, 79,100; September, 100,200; October, 121,600; ovember, 90,300; December, 34,050.

1916.—January, 55,200; February, 58,380; March, 95,800; April, 248,080; ay, 128,200; June, 74,300.

One hundred and sixty-one schools, classes, etc., visited the park, ith a total of 8,679 individuals.

IMPROVEMENTS.

The hospital and laboratory building which was mentioned in last ar's report has been nearly completed, lacking only the interior tings and the necessary outside yards. It is a pleasing structure, ilt, after the designs of the municipal architect, of blue gneiss of is neighborhood, warmly colored by infiltration of iron oxide. A taining wall was built and some grading done to provide sufficient area near the building for quarantine quarters for such animals as do not require artificial heat. Many of the chestnut trees surrounding the building became blasted by the "chestnut blight" and had to be cut down. A roadway of tar-bound macadam was constructed about the building connecting with the nearest main driveway. Connection with the nearest sewer (in Klingle Road) has been effected. Preparation should now be made to put the laboratory into effective operation. A modest supply of the necessary apparatus should be furnished in order that suitable facilities may be available for post mortem examination by the Government bureaus cooperating with the Zoological Park.

Attention has previously been called to the fact that the topography of the park is so irregular that it is difficult to find building sites with attached yards in convenient situations without extensive grading. A case in point occurs at the site of the barn which has been used for bison and other hoofed animals. The building here, made of logs with bark on, has become unsightly by decay and requires extensive repairs. It is situated on a hill of small elevation, but the slopes of which are sufficiently steep to cause continual erosion when it is worn by the hoofs of the animals. It was therefore thought best to grade down this hill and fill up the adjoining gullies, much enlarging the area of the yards. In order to do this effectively, it was necessary to borrow earth from the prominent ridge that extends from the zebu house northwesterly to the camel yards. About 25,000 square feet will be added to the level ground previously available. Only a portion of this work will be defrayed from the current appropriation, the remainder from next year's appropriation. The work was let out by contract, very favorable terms being secured. The additional paddocks thus obtained will be used, in part, for the exhibition of the beautiful ruminants presented to the park by the Duke of Bedford.

New sheds were built in the property yard for temporarily housing these animals and others displaced during the alteration of their regular quarters.

A needed convenience was provided at the elephant's quarters by installing, at small cost, hydraulic lifts to raise the heavy doors which give access to the outside yards.

The inclosure for ducks near the flight cage was reconstructed to make it safe from raccoons, etc.

A concrete driveway was constructed in the rear of the bear yards to provide for convenient transfer of animals and care of the quarters.

A motor truck was purchased during the year to haul food supplies, for which a trip is made every day except Sunday to the market

fish wharf. A shelter house for the truck was built near the
use.

arations were begun near the close of the year for building an
nal toilet room for women, to be located in the valley a little
he large flight cage.

ALTERATION OF WESTERN BOUNDARY.

pears desirable to recapitulate for future reference the various
hrough which this matter has passed.

following appropriation was made by the act approved June
3:

> istment of boundaries: For acquiring, by condemnation, all the lots,
> r parcels of land, other than the one hereinafter excepted, that lie
> the present western boundary of the National Zoological Park and
> cut Avenue from Cathedral Avenue to Klingle Road, $107,200, or such
> hereof as may be necessary, said land when acquired, together with
> ded highways, to be added to and become a part of the National Zoologi-
> . The proceedings for the condemnation of said land shall be insti-
> the Secretary of the Treasury under and in accordance with the terms
> isions of subchapter 1 of chapter 15 of the Code of Law for the
> of Columbia.

e act requires that the proceedings be instituted by the Sec-
of the Treasury, the attention of that official was called to
ter in a letter from the Secretary of the Smithsonian Insti-
dated June 28, 1913. A special survey and plat of the land
was necessary, but this plat was not forwarded to the
nent of Justice until November 5, 1913. Other delays en-
he title of the various owners of the land had to be investi-
nd it was not until March 11, 1914, that the District court
a jury to be summoned. A hearing was set for April 10,
d a final hearing of the case was heard by the jury on July
ving. The verdict of the jury was not filed until December
4. The hearing of objections to the verdict much delayed
conclusion, especially as the time of the court was almost
occupied by a contest in an important will case. It was not
une 28, 1915, over two years from the passage of the appro-
act, that the court confirmed the verdict as regards the
for damages for the land to be taken. The benefits assessed
the neighboring property were set aside by this and by a
ent decision of January 28, 1916. The decree of the court
e amount required for the purchase of the land at $194,438.08.
t of the proceedings for condemnation was $2,203.35.

great delay caused by these legal proceedings occasioned an-
mplication. The appropriation made by the act of June 23,
as not a continuing one, but lapsed at the end of one year.

Consequently after June 30, 1915, there was nothing available to defray the purchase of the land.

An item for an additional appropriation and for a reappropriation of the original sum appropriated by the act of June 23, 1913, was submitted to Congress, but was not favorably considered by the House of Representatives. It was introduced in the Senate as an amendment to the sundry civil bill, but was dropped by the conference committee.

A similar item was offered in the Senate as an amendment to the District of Columbia appropriation bill, was accepted in Committee of the Whole, but thrown out finally in consequence of an appeal for retrenchment.

It is greatly to be regretted that this appropriation failed, as it is exceedingly desirable that the anomalous and inconvenient situation of the park should be remedied as soon as possible. It now fronts on no principal thoroughfare and attains none of the dignity which an institution controlled by the Government should have.

IMPORTANT NEEDS.

Aviary building.—Attention has been called to the need for this building in almost every annual report since 1908. The following is an extract from that document:

> The temporary bird house is crowded during the winter far beyond its proper capacity, and it is impossible to care for the birds satisfactorily. When it was built, and also at the time that additions were made, the funds available for the purpose were so small that it was necessary to build in the cheapest manner possible, so that the house has already required considerable repair and will very soon have to be largely rebuilt. The park has a good collection of birds, including a number of rare, interesting, and valuable specimens, sufficient to fill at once a large aviary and make one of the most important and attractive features of the park.

In the report for 1909 will be found the following:

> The need for a structure of this character is evident to any intelligent visitor to the park. Only a part of the collection can now be exhibited to the public, because of lack of room. A number of outdoor shelters and cages should also be provided for the exhibition of hardy birds.

Again, in the report for 1912 will be found:

> In spite of all efforts the fine collection of birds in the park is very far from being adequately housed. The wooden building in which the larger number are kept is too small, too low, insanitary, and really unworthy of a national institution. It was built in the cheapest manner to meet an emergency, and, although considerable sums have been spent on it for repairs, it is far from satisfactory. It is desired to build a suitable aviary in the western part of the park and to group about this the cages for the eagles, vultures, condors, and owls, now scattered somewhat irregularly about the grounds. It is believed that a suitable structure can be built for about $80,000.

; was again urged in 1914 as follows:

> tention has been called for several years past to the importance of erecting itable house for the care and preservation of the birds of the collection, of which are now housed in a low wooden temporary structure which is io means suitable for the purpose and has to be constantly renewed by irs. The matter has been repeatedly urged upon Congress and an appro- tion of $80,000 asked for a new structure. This is by no means an extrava- sum, as the aviaries of most zoological collections cost considerably more this.

.lso, in 1915:

> :ogressive deterioration of the temporary bird house again made repairs ssary there. The wooden floor, which had already been rebuilt twice, was aced with concrete, as was also a part of the wooden foundation. The cost his work was $700. This building is an example of the ultimate costliness heap temporary construction.
>
> * * * * * * *
>
> n aviary building is still a most urgent need, and repeated efforts have been le to secure an appropriation for this purpose.

:t has been with great difficulty that the collection of birds has n kept in a fairly presentable condition. The building in which y are housed is a very common frame structure that has been aired several times. The birds are crowded and not exhibited to vantage. In view of the fact that fine aviaries have been built at w York, Philadelphia, Boston, and Chicago, it seems most unfor- ate that the national collection should have to be housed in this nner. It has been most unfavorably criticised by visitors.

The urgent needs of the park will be by no means satisfied by the istruction of an aviary only. There are other buildings urgently ded for the proper housing and exhibition of the animals and the nfort of the public. Among these are the following mentioned in report of last year:

A building for elephants, hippopotami, and similar animals.—The rk has at present several interesting animals belonging to this oup, including two species of elephants, two fine hippopotami, ur tapirs, and other specimens. Some of these animals are large and werful, and it is difficult to keep them safely in the insecure quar- s to which it has been necessary to assign them. It is also reason- ly certain that other similar animals will be added to the collection thin a short time. A house for this group should be substantially nstructed and occupy a space of at least 170 by 88 feet, with cages both sides, 80 feet deep on one side and 60 feet on the other.

A public comfort building and restaurant.—This should be a ilding about 80 feet by 60 feet, including porches and a rest room r ladies. It is urgently needed, as the park is a considerable distance from town and is annually visited by over 1,000,000 people, including many young children. The present restaurant is so only in name, it being a makeshift affair, open on all sides, established on a temporary platform and affording no shelter during the driving and violent rainstorms that are so common here in summer. It frequently occurs that large numbers of people are drenched with rain before they can traverse the considerable distance between the deep valley in which the park is situated and a place of shelter. Most zoological parks are provided with spacious and commodious quarters of this kind.

Gatehouses.—Suitable gatehouses should be erected at the principal entrances to the park, viz: Those near Connecticut Avenue, at Quarry Road (Harvard Street), and at Adams Mill Road. It is sometimes necessary to close the entrances promptly, as in the case of the escape of an animal or for arrest of some offender. Besides this, the present entrance gates are far from dignified or suitable for a Government institution. They are properly merely temporary, awaiting the time when the boundaries of the park are definitely fixed. Each gatehouse should have not only quarters for the watchman but also toilet facilities.

Boundary fence.—In connection with this the inclosing boundary fence of the park should be considered. The present fence is of the type known as the "Page woven-wire fence."

It is believed that it would be more economical and efficient to construct a practically permanent iron fence than to replace the present nearly worn-out structure by another of similar character. It is suggested that the matter be referred to several iron-fence builders with a request for designs and prices. While the first cost of such a fence would undoubtedly be much greater, it would many times outlast the present structure and could be absolutely depended on to stop animals and men. Certain animals and game birds could be allowed to run at large within the park were it entirely certain that the fence would prevent their escape. We already have at large peacocks, wild turkeys, and squirrels, and it would be easy to considerably increase this list. It should be remembered that on several rare occasions caged animals have become loose within the park, and it is by no means certain that such accidents will not again occur. A few years ago the superintendent of the park was sued for damages alleged to be due to the escape of a wolf. The park is well wooded and a sudden heavy gale may throw tree trunks across the paddock fences, breaking them down and thus leading to the escape of the animals. Should this occur during the darkness of a stormy night it would be practically impossible for the keepers and watchmen to confine the animals again until daylight.

These improvements were urged in the last year's report. There e others perhaps equally important which are needed to bring the tablishment up to the modern standard of what a zoological park ight to be. Most of these have been mentioned from time to time other reports or have been urged upon the appropriation comittees of Congress. They are briefly as follows:

Administration building.—The present office of the park is in an old welling house situated rather remotely from the buildings for the nimals and inconveniently for the prompt and constant supervision f the operations of the park, as is the general practice in the foreign ological gardens. A modest office building should now be erected a central location. This would greatly expedite the general work f the park and improve the discipline of the working force. It is timated that a building 50 by 36 feet, to contain office rooms, a rafting room, and a room for specimens would be sufficient.

Stable and forage barn.—There should be a stable and garage here the work horses and automobiles of the park could be stored. hese should be on the ground floor, a storage loft for forage above. he dimensions should be at least 100 by 40 feet.

Shop.—The present shop is not large enough to accommodate onveniently the carpenters employed at the park. The woodworkng plant is now dangerously near the blacksmith shop and the cenral heating plant. A separate building 100 by 46 feet should be rected.

Ape house.—Special quarters should be provided for the large nthropoid apes. These are probably the most interesting animals at can be exhibited and require special treatment and care. The roup comprises the gorilla, the orang, several species of chimpanzee nd of gibbon. They are so nearly related to man that observation nd study of them is of the highest importance. The park has now nly a chimpanzee, and it has been necessary to provide special quarers for him. It would be quite proper to place in the same building me of the larger species of baboons, as they require nearly the same reatment. A house for these animals should have a main building 50 by 60 feet, cages on both sides, and a wing 90 by 60 feet also, ith similar cages. Outside cages should be erected along the 150 eet of the main building 18 feet deep, along the sides and end of ing 16 feet deep.

Lion house.—The house now occupied by the cat tribe is quite too mall for the purpose, and it has always been intended to increase its apacity both by replacing the wooden extension by a masonry tructure and by building an addition 120 feet long across the north nd of the present building. This, of course, would be fitted with ages both within and without.

Reptile house.—No properly appointed house for reptiles now exists here, and the few specimens we have are inconveniently and unsuitably exhibited in the lion house. There should be a house 120 by 50 feet, with properly fitted cases on both sides and having a wing 20 by 50 feet with table exhibits. This would enable the park to exhibit all the important snakes of the United States and the principal ones of the western hemisphere, as well as the cobras and others of tropical East India; also the extremely varied group of lizards, the different species of crocodiles, etc.

Tortoise house.—Almost at the inception of the park a group of giant tortoises from the Galapagos Islands was obtained from Hon. Walter Rothschild. These still remain and might well form the nucleus of a collection of the tortoises of the world. A house 80 by 45 feet, with cages on both sides and yards 16 feet deep, would accommodate such a collection.

House for zebras, wild asses, and others of the horse family.—The park has already an interesting exhibit of this family including the Mongolian wild horse and two species of zebra. This should be enlarged and suitable quarters provided in a house 120 by 44 feet. The stalls should be on one side only and yards 50 feet deep be arranged.

House for tropical antelopes.—The teeming African fauna should be represented much more fully. It would require a house at least 175 feet by 75 with stalls on both sides and with commodious yards arranged about it in an elliptical form ranging in depth from 40 feet to 80 feet. Some of the stalls should be fitted up for giraffes.

House for tropical deer and swine.—A few specimens are already found in the collection. An adequate exhibit would require a house 100 feet by 45 feet with cages on both sides, the yards 30 feet deep on one side and 50 feet on the other.

House for marsupials.—The group of pouched animals, such as kangaroos, wallabies, opossums, wombats, Tasmanian wolves, etc., should be exhibited apart from the other mammals. These animals are dying out, rapidly diminishing in number year by year. They should have a house 120 feet by 40 feet with cages on both sides, the yards being 60 feet deep on one side, 20 feet on the other.

Pheasantry.—Besides the general aviary building, which it is hoped may soon be erected, separate quarters should be provided for certain groups of birds. Among these are the pheasants, comparatively hardy birds of very showy plumage, offering great variety. An exhibit can be secured at a reasonable expense. A house for them should be a low structure 140 by 18 feet. Visitors should not be admitted to this house; the birds would be seen in the outside yards which should be about 25 feet deep. A small appropriation will be asked of the present Congress for the establishment of a pheasantry.

Ostrich house.—The ostriches and their near relatives the emus, ie rheas, and the cassowaries are so large and important that they iould have a house to themselves. This should be 120 feet by 35 et, with cages on one side only and yards giving plenty of room r exercise from 30 to 100 feet deep.

Tropical waterfowl.—These birds require heat during the cold ason and the house would be really their winter quarters. During ne summer they would be in the large "flight cage" or in some other utdoor inclosure. A house 120 by 50 feet, with cages on one side nd one end, would be required.

Tropical birds of prey.—These require similar treatment but could ot, of course, be housed with the waterfowl. A house 80 by 45 feet ith cages on both sides and outside cages 18 feet deep would be eeded.

Aquarium.—An exhibit of fish and other aquatic creatures is necesary to a complete survey of the domain of zoology. Such an exhibit as for a few years shown at the park and was one of the most popur features of the collection. It was installed in a rude frame strucre erected for temporary use as a carpenters' shop. The tanks and ther apparatus were furnished by the United States Fish Commison, having been used at the Atlanta Exposition. The building beame quite unsafe and in 1901 Congress was asked to appropriate 25,000 toward the construction of a permanent structure. As this as not granted it became necessary to abandon the exhibit until such me as Congress may enable it to be properly housed. A building bout 130 by 50 feet would be sufficient for the present.

Insectary.—In several European gardens an exhibit under glass is ade of social and other interesting insects, such as ants, bees, wasps, utterflies, moths, etc. These have proved very attractive and are nexpensive. A house 60 feet by 30 feet with wall cases and table ases would accommodate such an exhibit.

The foregoing list merely recapitulates the needs of a fairly comlete establishment such as may be seen in the European capitals. It ould be well if the municipal architect, to whom the park is required o go for plans and specifications for buildings, could be asked to repare estimates of cost for all of the above improvements to preent to Congress.

In order to accommodate the buildings a considerable amount of rading should be done. The park is already cramped for space for onvenient parking of vehicles upon crowded days. Over 50 automoiles and sight-seeing cars are sometimes assembled here at once, and here is great difficulty in managing them. A request for an approriation of $4,000 for grading banks and filling ravines which was sked of Congress last year will be renewed.

Automobile.—The office of the park very much needs to have a small automobile for use in attending to the public business. The distances within the park itself are so considerable that it is a great waste of time and energy to traverse them on foot, or by horse vehicle, and the use of an automobile would greatly increase efficiency in the business of the park. The purchase does not involve any increase of the appropriation for the park, but merely the insertion of a clause in the appropriation act authorizing the purchase of a motor-propelled vehicle.

Roads.—The ordinary thoroughfares in the park were, at the close of the fiscal year, in fair condition. Nothing has been done, however, toward the repairing of the injury done by the construction by the District of the main trunk sewer known as the Rock Creek Main Interceptor. Attempts were made to get an appropriation to repair this defacement of the natural beauty of the park, but as yet without avail. The remarks then made were as follows:

> By authority of Congress a large sewer has been constructed on the right bank of Rock Creek through the entire length of the park, part of it being laid in a deep open cut, and part of it in a tunnel. A very large amount of rock has been excavated by blasting and this has been piled along the bank of the stream, destroying the natural beauty of the park by large piles of fragments of stone. While the contractor was required to "restore the surface as nearly as possible to the condition in which he found it," yet the amount of disturbance is so great that it is practically impossible to do this. It is proposed to cover these stone heaps with earth and to plant upon them, trees and shrubs which will modify the unsightly appearance: A narrow road can be formed upon the top of the open cut sewer which will be a convenience to the public entering the park from the southern end.

The general appropriation for the park has remained at $100,000 per annum for six years past. This has had to suffice for the repairs and construction of buildings, the care of grounds, and the maintenance of roads and walks. In the meantime the cost of supplies, materials of all kinds, and labor has steadily increased so that there has been no opportunity to make even the most necessary improvements. The appropriations should be markedly increased, since a well-equipped zoological park is something of which the nation may well be proud.

Respectfully submitted.

Frank Baker,
Superintendent.

Dr. Charles D. Walcott,
Secretary of the Smithsonian Institution,
Washington, D. C.

APPENDIX 5.

REPORT ON THE ASTROPHYSICAL OBSERVATORY.

SIR: I have the honor to present the following report on the operaions of the Smithsonian Astrophysical Observatory for the year nding June 30, 1916.

EQUIPMENT.

The equipment of the observatory is as follows:

(*a*) At Washington there is an inclosure of about 16,000 square et, containing five small frame buildings used for observing and mputing purposes, three movable frame shelters covering several it-of-door pieces of apparatus, and also one small brick building ntaining a storage battery and electrical distribution apparatus.

(*b*) At Mount Wilson, Cal., upon a leased plat of ground 100 feet uare, in horizontal projection, are located a one-story cement obrving structure, designed especially for solar-constant measureents, and also a little frame cottage, 21 feet by 25 feet, for observer's arters. Upon the observing shelter at Mount Wilson there is a wer 40 feet high above the 12-foot piers which had been prepared the original construction of the building. This tower is equipped ith a tower telescope for use when observing (with the spectrobometer) the distribution of radiation over the sun's disk.

During the year apparatus for research has been purchased or conructed at the observatory shop. The value of these additions to e instrumental equipment is estimated at $1,500.

WORK OF THE YEAR.

1. AT WASHINGTON.

Some years ago the Institution lent the Harvard College Observaory a silver-disk pyrheliometer for use at Arequipa, Peru. By reuest of Prof. Pickering the observations which had accumulated ince August, 1912, were reduced at the Astrophysical Observatory nd published by the Smithsonian Institution during the past year.[1] wing to the high altitude of Arequipa the variations of solar radiaion observed at a fixed zenith distance of the sun (as, for instance, that whose secant is 1.2) were found to be almost wholly governed by three things—the atmospheric humidity, the distance of the sun, and the variations of the sun's emission. Hence from measurements of the humidity by the psychrometer it was possible to compute from the observed radiation the probable intensity of the solar radiation outside the atmosphere for each day. These empirical solar-constant values from Arequipa observations confirm the variations of the sun observed at Mount Wilson by the complete spectrobolometric process. Indeed, it appears that if eight or ten well-separated stations at high altitudes should be equipped with the pyrheliometer and psychrometer their combined results might well be expected to determine closely enough the sun's variations. A most interesting feature of Arequipa observations is that there is nothing anomalous about the observations of 1912 to suggest that the volcanic eruption of Mount Katmai (of June 6, 1912), which produced a great deal of dust all over the northern hemisphere, produced any turbidity of the atmosphere whatever south of the Equator.

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[1] Arequipa Pyrheliometry, Smithsonian Misc. Coll., Vol. 65, No. 9, 1916.

Results of Mount Wilson solar-constant observations have been furnished in advance of publication to Dr. Bauer of the Carnegie Institution for comparison with magnetic data. He finds a close correlation between certain fluctuations of the earth's magnetic field and the variations of solar radiation.

The tower-telescope observations of the distribution of radiation along the diameter of the sun's disk, made at Mount Wilson in 1913 and 1914, having been fully reduced, a preliminary publication of them has been made by the Smithsonian Institution.[1] These results show distinctly that the average distribution of solar radiation over the solar disk varies from year to year. Greater contrast of brightness between the center and limb of the sun prevailed in 1907 and 1914 than in 1913. The change is greater for short wave lengths than for longer ones. Changes also occur from day to day. Both of these kinds of changes are found correlated with changes of the solar constant of radiation, but in opposite senses. High values of the solar radiation attend periods of greater solar activity and are associated with increased contrast of brightness between the center and edge of the solar disk. For short-period fluctuations of solar radiation, however, low values of solar radiation are associated with increased contrast. It seems reasonable to suppose that the first kind of phenomena is caused by increased convection in the sun, bringing fresh radiating surfaces forward more rapidly, thus increasing the effective solar temperature. The second kind of phenomena may be caused by temporary increases of the turbidity of the outer solar envelopes, restricting the solar emission especially at the limb.

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[1] On the distribution of radiation over the sun's disk and new evidence of the solar variability, Smithsonian Misc. Coll., Vol. 66, No. 5, May, 1916.

Mount Wilson observations of 1915, including both the solar-con- nt work and the tower work, have been almost all reduced.

Mr. Fowle has continued at intervals between other work the re- ction of his numerous observations of the transmission of rays of eat wave length through long columns of air of known humidity. any sources of error have required to be considered and eliminated, d the reading and reduction of the curves of observation was ex- mely tedious. The results are at length reaching such a stage that can be seen that they fall into excellent agreement and will be of gh interest in connection with studies of the earth's temperature dependent on its radiation outward toward space. In fact, the sults of Mr. Fowle's work are expected to be ready for publication ithin a short time.

For some years we have endeavored to design and construct an in- rument capable of measuring accurately the intensity of sky light y day and of radiation outward toward the whole sky by night. t last success seems to be reached in an instrument devised by essrs. Abbot and Aldrich and constructed by Mr. Kramer. The strument is called the pyranometer, from the Greek words πῦρ, re, ἀνά, up, μέτρον, a measure; thus designating an instrument dapted to measure heat coming from or going to space above. he pyranometer is somewhat after the principle of the Ångström yrheliometer, in that the intensity of radiation is measured by lectrical compensating currents, whose strength is adjusted with eference to the indications of a delicate thermocouple. A full ac- ount of the instrument has been published by the Smithsonian nstitution,[1] including the tests which have been made to determine ts accuracy by comparisons in solar measurements with the pyrheli- meter. Complete accord between the two instruments is found at all ltitudes of the sun when due regard is paid to the fact that the yranometer presents a horizontal surface. The pyranometer seems o be suitable for botanical investigations, for it is capable of measur- ng the radiation even in deep shade, as in forests and greenhouses, s well as in full sun. In short, it can measure radiation in all situa- ions where plants are accustomed to grow, except under water.

The consideration of the pyranometer has led us to undertake he determination of the constant ordinarily called "sigma" of tefan's formula of radiation, according to which the emission of perfect radiator per square centimeter per second is equal to the ourth power of the absolute temperature multiplied by "sigma." n recent years a good deal of disagreement has arisen as to the alue of "sigma." We require to use it for certain tests of the pyranometer and have devised a new method which seems very free from error for making its determination. The apparatus has been constructed and is now set up practically ready for use.

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[1] The pyranometer—an instrument for measuring sky radiation: Smithsonian Misc. Coll., ol. 66, No. 7, May, 1916.

2. AT MOUNT WILSON.

Messrs. Abbot and Aldrich continued observations at Mount Wilson of the solar constant of radiation from July 1 to October 22, 1915, and renewed the expedition early in June, 1916. Besides conducting solar-constant observations and determinations of the distribution of light over the sun's disk in seven different wave lengths on each favorable day, comparisons of the pyrheliometers used ordinarily on Mount Wilson were made in both 1915 and 1916 with standard water-flow pyrheliometer No. 3. The comparisons showed no change to have occurred in the sensitiveness of secondary pyrheliometers Nos. IV and VII, on whose readings rest the solar-constant determinations made at Mount Wilson since 1906.

A good deal of attention was also given to the installation and trial of a solar cooking apparatus comprising ovens heated by oil under gravity circulation maintained by heat collected by a concave cylindric mirror of about 100 square feet surface. The apparatus seems highly promising, but owing to a couple of defects was not in satisfactory operation until after the close of the period covered by this report.

3. PROPOSED SOLAR-CONSTANT EXPEDITION.

On recommendation of the writer an allotment was made from the Hodgkins fund of the Smithsonian Institution for the purpose of duplicating the solar-constant work of Mount Wilson at the most favorable station on the earth. The expedition is being prepared and will go forward, probably to South America, in the summer of 1917. It is intended to continue solar-constant determinations by the spectro-bolometric method on every favorable day in every month of the year for several years at both Mount Wilson and the station in South America, with a view to determining the dependence of the earth's climatic conditions on the sun's variations of radiation.

SUMMARY.

Observations of several kinds have been made, reduced, and published which support one another in confirming the variability of the sun, and some of which tend to indicate dual causes of it. An expedition is proposed to occupy the most favorable station in South America for several years, beginning in 1917, for the purpose of making, in connection with the Mount Wilson observations, a full and accurate determination of the solar variation for comparison with climatic changes. Measurements of the transmission of long-wave rays through long columns of moist air are almost ready for publication and appear to be resulting very satisfactorily. A new instrument, called the pyranometer, for measuring skylight and nocturnal radiation has been tested and found accurate.

Respectfully submitted.

C. G. Abbot,
Director Astrophysical Observatory.

Dr. C. D. Walcott,
Secretary of the Smithsonian Institution.

APPENDIX 6.

REPORT ON THE LIBRARY.

SIR: I have the honor to submit the following report on the operations of the library of the Smithsonian Institution during the fiscal year ending June 30, 1916:

The number of packages of books received during the year was 31,017, as compared with 29,928 packages in the year preceding. Of these 29,619 were received by mail and 1,400 through the International Exchange Service. Correspondence in connection with these included 1,241 letters and 3,997 acknowledgments on the regular printed form. The total accessions of books, pamphlets, and parts of sets aggregated 11,755.

SMITHSONIAN MAIN LIBRARY.

Publications for the main Smithsonian library are forwarded each day, after entering, to the Smithsonian deposit in the Library of Congress. Those catalogued and accessioned during the fiscal year numbered in all 18,637, which may be further described as 3,101 volumes. 739 parts of volumes, 383 pamphlets, 13,155 periodicals, 211 charts and 1,038 parts of serials to complete sets; extending the numbers in the accession book from 521,617 to 525,255.

The cataloguing included 5,045 volumes, 200 charts, and the adding of 738 new titles and the making of 5,329 typewritten cards; 3,480 printed cards from the Library of Congress for publications deposited by the Institution were filed in the catalogue. In addition, 3,596 volumes were recatalogued on standard size cards, from the old catalogue for inclusion in the new catalogue.

Documents relating to public matters and statistics of foreign countries, presented to the Smithsonian Institution largely in return for its own publications, were forwarded to the Library of Congress without stamping or recording, continuing a policy of some years standing. The publications sent in this way numbered 4,642.

Dissertations were received from Utrecht, Toulouse, Lund, Upsala. Leiden, Leipzig, Giessen, Paris, Bern, Pennsylvania, and Johns Hopkins, and from the Technical Hochschules of Berlin and Stuttgart.

Mr. Herbert A. Gill, administrator of the estate of Dr. Theodore Nicholas Gill, has presented his brother's scientific library to the Smithsonian Institution with the understanding that it is to be redited to the estate and that such publications as relate to the work f the Museum shall be placed in that library.

The securing of exchanges in return for Smithsonian publications nd missing parts to complete the sets have been continued, notwithtanding war conditions abroad, and the results have added new titles nd completed sets and series. In response to the requests for missing parts in the Smithsonian deposit in the Library of Congress 50 sets were completed and 1,038 parts supplied. These numbers include he completing of 30 sets in the series of publications of learned institutions and scientific societies, and the supplying of 824 parts and the completing of 20 volumes of periodicals, and the supplying of 212 separate numbers.

SMITHSONIAN OFFICE LIBRARY.

The office library includes a collection of books relating to art, the employees library, and various works of reference, besides quite an extensive aeronautical library.

In the reference room the transactions of scientific societies, and in the reading room the current foreign and domestic periodicals, have been in constant use. In the latter there are now 189 titles on the shelves.

In addition to the use of the library by the scientific staff of the Institution, almost all of the bureaus of the Government have availed themselves of the privileges of consulting and using the publications in the libraries.

From the reference and reading rooms in the Institution 3,330 publications were circulated during the year. Of these 473 were bound volumes and 2,857 were single periodicals.

Additions have been made to the aeronautical collection by way of exchange and by purchase of a few of the important works recently published. An acquisition of special value was a number of reference works formerly in the library of Maj. Baden-Powell.

A scrap book of articles from the older magazines is of interest, as describing early inventions in the arts, brought together and arranged in chronological order.

Dr. Alexander Graham Bell has continued to add to his collection of works relating to aeronautics by contributing 33 books and 37 portfolios and periodicals. This working library, which Dr. Bell used constantly while carrying on his experiments in aeronautics, will be of great value to students in the future. In addition to Dr. Bell's gift a total of 58 volumes were added during the year.

NATIONAL MUSEUM LIBRARY.

The library of the National Museum has been handicapped, as has almost every library in the country, by the nonreceipt of many European publications on account of the war.

Accessions.—There are now in the Museum library 47,713 volumes, 79,241 pamphlets and unbound papers, and 124 manuscripts. During the year just closed the accessions numbered 1,895 volumes, 2,873 pamphlets, and 72 parts of volumes.

Cataloguing.—New material was entered as received and sent out to the shelves or to the sectional libraries, so that it would be available at once to those interested. The recataloguing from the larger cards to the standard size, and the identification of the publications has been continued.

The new publications catalogued numbered 914 books, 3,157 pamphlets, and the total number of cards made was 4,669. The periodicals and parts of publications catalogued numbered 9,674, and periodical cards were made for 25 new publications; 2,025 section cards were made for periodicals assigned to sectional libraries, and 460 new periodical cards were written for the Museum library record.

There were recatalogued 135 books, 275 pamphlets, necessitating the making of 415 cards.

Exchanges.—Notwithstanding the conditions abroad, the efforts to secure missing parts and new exchanges have been continued. In connection with this work 257 letters were written, with the result that many parts that were lacking were supplied and many new titles were secured.

Loans.—During the year the loans from the general library numbered 12,085 publications, which includes books assigned to the sectional libraries, 4,978; 3,228 books borrowed from the Library of Congress, which included those from the Smithsonian collection; 207 from the Department of Agriculture library; 100 from the United States Geological Survey; 50 from the Army Medical Museum library; and 11 from other places. From the Museum shelves there were borrowed 3,511 volumes, and 1,899 section cards were made.

Binding.—The binding of the publications that have come to the Museum in parts, or paper covers, in order that they may be properly cared for and saved from destruction, is still a serious matter, as many remain unbound. It was possible this year to bind more than last year, which has relieved the situation; but it will take several years, at the present rate, to catch up with the needs of the library in this direction.

There were 799 volumes prepared and sent to the Government binder. Of this number 625 were returned to the Museum before the close of the year.

Gifts.—The following persons have contributed to the collection in the building: Dr. William Healey Dall, Dr. Edgar A. Mearns, Dr. Charles Doolittle Walcott, Dr. Oliver Perry Hay, Dr. F. Alexander McDermott, Dr. F. P. Dewey, Dr. Walter Hough, Mr. William R. Maxon, Dr. A. C. Peale estate, and the estate of Dr. Theodore Nicholas Gill.

Dall Collection.—Dr. William Healey Dall has continued to contribute to his collection of books relating to mollusks which he presented some years ago for the sectional library of the division of mollusks. Since July 1, 1915, he has added 207 titles.

Gill collection.—All the books and pamphlets from the estate of Dr. Theodore Nicholas Gill are being classified and arranged so that they can be properly distributed. From the hasty examination made in looking over the collection as it was being transferred it appears that the Museum library will have a valuable addition to its series of works relating to natural history, especially in ichthyology.

Technological series.—In this branch of the library there have been catalogued 1,052 volumes and 2,125 pamphlets, making a total of 3,177. The cards typewritten and filed in connection with this work numbered 3,505, the periodicals entered 3,631.

The books and pamphlets withdrawn for consultation in connection with the work of the Museum from this part of the library numbered 537. This is in addition to those borrowed from the central library.

The filing of cards in the scientific depository set of printed cards from the Library of Congress has been continued. Two thousand and thirty-three author cards and 4,031 subjects cards were placed in the alphabetical series.

Sectional libraries.—The checking of publications assigned to the sectional libraries has been continued as the other work would allow, and while some progress has been made the work is not near completion.

The following is a complete list of the sectional libraries:

Administration.
Administrative assistant's office.
Anthropology.
Biology.
Birds.
Botany.
Comparative anatomy.
Editor's office.
Ethnology.
Fishes.
Geology.
Graphic arts.
History.
Insects.

Invertebrate paleontology.
Mammals.
Marine invertebrates.
Materia medica.
Mechanical technology.
Mesozoic fossils.
Mineral technology.
Minerals.
Mollusks.
Oriental archeology.
Paleobotany.
Parasites.
Photography.
Physical anthropology.
Prehistoric archeology.
Property clerk.
Reptiles and batrachians.
Superintendent's office.
Taxidermy.
Textiles.
Vertebrate paleontology.

LIBRARY OF BUREAU OF AMERICAL ETHNOLOGY.

The collection of works relating to ethnology is administered by the ethnologist-in-charge, and an account of its operations will be found in the report of that bureau.

ASTROPHYSICAL OBSERVATORY LIBRARY.

The collection of reference works relating to astrophysics is in constant use, and during the year there were added 61 volumes, 20 parts of volumes, and 18 pamphlets.

NATIONAL ZOOLOGICAL PARK LIBRARY.

This library contains publications relating to the work of the park and the care of the animals, reports of other zoological parks, and works on landscape gardening. The number of publications added was 21 volumes and 5 pamphlets.

SUMMARY OF ACCESSIONS.

The accessions during the year, with the exception of the library of the Bureau of American Ethnology, may be summarized as follows:

To the Smithsonian deposit in the Library of Congress, including parts to complete sets	5,472
To the Smithsonian office, Astrophysical Observatory, and National Zoological Park	1,443
To the United States National Museum	4,840
Total	11,755

Respectfully submitted.

Paul Brockett,
Assistant Librarian.

Dr. Charles D. Walcott,
Secretary of the Smithsonian Institution.

APPENDIX 7.

REPORT ON THE INTERNATIONAL CATALOGUE OF SCIENTIFIC LITERATURE.

SIR: I have the honor to submit the following report on the opera- ns of the United States Bureau of the International Catalogue of ientific Literature for the fiscal year ending June 30, 1916:

Each year 17 volumes of the catalogue are published by the Central ıreau in London, one volume for each of the following named iences: Mathematics, mechanics, physics, chemistry, astronomy, eteorology, mineralogy, geology, geography, palaeontology, gen- al biology, botany, zoology, anatomy, anthropology, physiology, d bacteriology.

The publication was begun in 1901, and since then all of the first annual issues have been published, together with 14 volumes of e twelfth issue, 10 volumes of the thirteenth issue, and 1 volume the fourteenth, a total of 212 regular volumes, in addition to veral special volumes of schedules, lists of journals, etc.

The 14 volumes of the twelfth issue published are mathematics, echanics, physics, chemistry, astronomy, meteorology, mineralogy, ography, palaeontology, general biology, botany, zoology, anatomy, d anthropology.

The 10 volumes of the thirteenth issue published are mathematics, echanics, physics, astronomy, meteorology, mineralogy, geography, laeontology, general biology, and zoology.

The one volume of the fourteenth issue published is zoology.

During the year there were 24,160 classified references to American entific literature prepared by this bureau as follows:

Literature of—	
1908	6
1909	2
1910	75
1911	369
1912	835
1913	3,948
1914	8,750
1915	10,175
Total	24,160

It was, of course, inevitable that an international cooperative enter- ise such as the International Catalogue should be affected by the war in Europe, but it is a matter of congratulation that the preparation and publication has been continued with comparatively little change. As was pointed out in the last report the finances of the catalogue had been seriously affected on account of the inability to collect the subscriptions from Germany, Austria, Hungary, Belgium, and Poland.

Before the beginning of the war the receipts and expenditures of the London Central Bureau approximately balanced and therefore as the delinquent remittances from the five subscribing countries above mentioned amounted to almost $6,000 a year it was necessary to obtain this sum in order to continue the publication.

The Royal Society of London very generously offered to make good this loss of income and made a grant of £1,100 to enable the thirteenth annual issue to be published. The Royal Society has subsequently granted additional sums aggregating £3,750 to enable the Central Bureau to continue the publication of the catalogue without interruption.

A request having been made for assistance from the United States the Secretary of the Smithsonian Institution became so interested in the subject that he was enabled to obtain a grant of $6,000 from the Carnegie Corporation of New York for the purpose of aiding American students by making it possible for the Central Bureau to publish the fourteenth annual issue of the catalogue.

The value and service to science of the work done by the catalogue is so universally recognized that any lapse in its regular publication would be a serious calamity.

The great need for a Catalogue of Scientific Literature was felt as far back as 1855 when Prof. Joseph Henry brought the subject to the attention of the British Association for the Advancement of Science. The idea resulted in the Royal Society's Catalogue of Scientific Papers which will, when completed, be a catalogue of periodical scientific literature from 1800 to 1900.

Though this catalogue is simply a list of titles by authors' names, including only periodical literature, it soon became evident that its production was too great a task for one society or even one nation to continue; therefore in 1893 a council of the Royal Society was held and a committee was appointed to consider the question. It was agreed that international cooperation should be obtained for the production of a complete subject and author catalogue of science beginning with 1901.

The value of such a catalogue as then proposed may be estimated when it is considered that some of the most eminent scientific men of the day were members of the committee. Among the members were Lord Kelvin, Lord Rayleigh, Sir Michael Foster, Sir Joseph Lister, and Dr. Ludwig Mond. At the first meeting Prof. Armstrong vas elected chairman and he has ever since been prominently identiied with the affairs of the catalogue.

To obtain international cooperation the committee caused over 00 letters to be sent to institutions and societies throughout the vorld and in 1895 a special meeting was called to confer with Prof. lexander Agassiz, who advised that an international conference be alled in 1896.

In the report of the committee it was stated "that in no single ase was any doubt expressed as to the extreme value of the work ontemplated," and "that the matter had been taken up in a most ordial manner by the Smithsonian Institution, the secretary of vhich, in his reply, refers to the desirability of a catalogue of the ind suggested as being so obvious that the work commends itself t once."

Three international conferences were held in London (1896, 1898, nd 1900), and as a result the publication of the catalogue was underaken.

It may be noted that among the prominent delegates attending hese conferences (not including those before mentioned as members f the Committee of the Royal Society) were Sir Norman Lockyer, rof. H. Poincaré, Prof. Simon Newcomb, Dr. John S. Billings, ight Hon. Sir. John E. Gorst, and Prof. Van't Hoff. On the adice of these and other prominent men the catalogue was begun.

The value of the catalogue is shown by the following resolution dopted 10 years after the publication was begun by the represenatives of the countries participating in the work:

> That in view of the success already achieved by the International Catalogue f Scientific Literature and the great importance of the objects promoted by t, it is imperative to continue the publication of the catalogue at least durng the period 1911–15 and on recommendation of the International Council uring the subsequent five years 1916–20. (The International Council of the atalogue has subsequently voted to extend the work during the period 1916–20.)

This convention was presided over by Sir Archibald Geikie, then resident of the Royal Society, and had among its members repreentatives from all of the principal countries of the world.

These men were thoroughly familiar with the service of the cataogue to the scientific men in their respective countries and voted nanimously to continue the work on account of the value and uccess achieved by it.

Respectfully submitted.

LEONARD C. GUNNELL,
Assistant in Charge.

Dr. CHARLES D. WALCOTT,
Secretary of the Smithsonian Institution.

Appendix 8.

REPORT ON THE PUBLICATIONS.

Sir: I have the honor to submit the following report on the publications of the Smithsonian Institution and its branches during the year ending June 30, 1916:

The Institution proper published during the year 22 papers in the series of Miscellaneous Collections, 2 annual reports, pamphlet copies of 54 papers from the general appendices of these reports, and 8 special publications. The Bureau of American Ethnology published 2 annual reports, separates of 4 accompanying papers in these reports, and 2 bulletins. The United States National Museum issued 1 annual report, 2 volumes of the proceedings, and 52 separate papers forming parts of these and other volumes, and 4 bulletins.

The total number of copies of publications distributed by the Institution and its branches was 153,262, which includes 249 volumes and separate memoirs of Smithsonian Contributions to Knowledge, 32,397 volumes and separate pamphlets of Smithsonian Miscellaneous Collections, 25,718 volumes and separate pamphlets of Smithsonian Annual Reports, 73,798 volumes and separates of National Museum publications, 12,420 publications of the Bureau of American Ethnology, 7,696 special publications, 47 volumes of the Annals of Astrophysical Observatory, 83 reports of the Harriman Alaska Expedition, and 647 reports of the American Historical Association.

SMITHSONIAN CONTRIBUTIONS TO KNOWLEDGE.

QUARTO.

The title-page, table of contents, and cover for volume 27 were issued, and there was in press at the close of the year a memoir by Dr. J. S. Foote, of Creighton Medical College, on "The comparative histology of the femur," the result of extended original research.

SMITHSONIAN MISCELLANEOUS COLLECTIONS.

OCTAVO.

Of the Miscellaneous Collections, volume 62, 2 papers were published; of volume 63, 1 paper; of volume 64, 3 papers; of volume 65, 8 papers and title-page and table of contents; of volume 66, 8 papers; in all, 22 papers, as follows:

Volume 62.

4. Reports on wind tunnel experiments in aerodynamics. By J. C. Hunsaker, E. Buckingham, H. E. Rossell, D. W. Douglas, C. L. Brand, and E. B. Wilson. Hodgkins Fund. January 15, 1916. 92 pp., 5 pls. (Publ. 2368.)
5. Dynamical stability of aeroplanes. By Jerome C. Hunsaker, assisted by T. H. Huff, D. W. Douglas, H. K. Chow, and V. E. Clark. Hodgkins Fund. June 30, 1916. 78 pp., 3 pls. (Publ. 2414.)

Volume 63.

6. Smithsonian Physical Tables. Reprint of sixth revised edition. By F. E. Fowle. February 18, 1916. xxxvi+355 pp. (Publ. 2269.)

Volume 64.

3. Cambrian Geology and Paleontology. III, No. 3. Cambrian trilobites. By Charles D. Walcott. January 14, 1916. Pp. 157–258, pls. 24–38. (Publ. 2370.)
4. Cambrian Geology and Paleontology. III, No. 4. Relations between the Cambrian and pre-Cambrian formations in the vicinity of Helena, Montana. By Charles D. Walcott. June 24, 1916. Pp. 259–301, pls. 39–44. (Publ. 2416.)
5. Cambrian Geology and Paleontology. III, No. 5. Cambrian trilobites. By Charles D. Walcott. In press.

Volume 65.

3. A study of the radiation of the atmosphere. Based upon observations of the nocturnal radiation during expeditions to Algeria and to California. By Anders Ångström. Hodgkins Fund. August 27, 1915. 159 pp. (Publ. 2354.)
6. Explorations and field work of the Smithsonian Institution in 1914. July 1, 1915. 95 pp., 1 pl. (Publ. 2363.)
9. Arequipa pyrheliometry. By C. G. Abbot. Hodgkins Fund. March 1, 1916. 24 pp. (Publ. 2367.)
10. A phylogenetic study of the recent crinoids, with special reference to the question of specialization through the partial or complete suppression of structural characters. By Austin H. Clark. August 19, 1915. 67 pp. (Publ. 2369.)
11. A magneton theory of the structure of the atom. By A. L. Parson. November 29, 1915. 80 pp., 2 pls. (Publ. 2371.)
12. The jaw of the Piltdown Man. By Gerrit S. Miller, jr. November 24, 1915. 31 pp., 5 pls. (Publ. 2376.)
13. Descriptions of seven new subspecies and one new species of African birds (Plantain-Eater, Courser, and Rail). By Edgar A. Mearns. November 26, 1915. 9 pp. (Publ. 2378.)
14. The sense organs on the mouth parts of the honey bee. By N. E. McIndoo. January 12, 1916. 55 pp. (Publ. 2381.)

le-page and table of contents. June 17, 1916. v pp. (Publ. 2419.)

Volume 66.

1. Descriptions of a new genus and eight new species and subspecies of African mammals. By N. Hollister. February 10, 1916. 8 pp. (Publ. 2416.)

No. 2. A list of the birds observed in Alaska and Northeastern Siberia during the summer of 1914. By F. Seymour Hersey. March 31, 1916. 33 pp. (Publ. 2408.)

No. 3. Explorations and field work of the Smithsonian Institution in 1915. May 27, 1916. 119 pp. (Publ. 2407.)

No. 4. The Ordaz and Dortal expeditions in search of El Dorado, as described on sixteenth century maps. By Rudolf Schuller. April 27, 1916. 15 pp., 2 maps. (Publ. 2411.)

No. 5. On the distribution of radiation over the sun's disk and new evidences of the solar variability. By C. G. Abbot, F. E. Fowle, and L. B. Aldrich. Hodgkins Fund. May 23, 1916. 24 pp., 1 pl. (Publ. 2412.)

No. 6. Phonetic transcription of Indian languages. In press.

No. 7. The Pyranometer—an instrument for measuring sky radiation. By C. G. Abbot and L. B. Aldrich. Hodgkins Fund. May 23, 1916. 9 pp. (Publ. 2417.)

No. 8. Three new African shrews of the genus Crocidura. By N. Hollister. May 23, 1916. 3 pp. (Publ. 2418.)

SMITHSONIAN ANNUAL REPORTS.

Report for 1914.

The completed volume of the Annual Report of the Board of Regents for 1914 was received from the Public Printer in August, 1915.

Annual Report of the Board of Regents of the Smithsonian Institution showing operations, expenditures, and condition of the Institution for the year ending June 30, 1914. xi+729 pp., 155 pls. (Publ. 2321.)

The general appendix contained the following papers, small editions of which were printed in pamphlet form:

The radiation of the sun. By C. G. Abbot. 16 pp., 4 pls. (Publ. 2322.)

Modern theories of the sun. By Jean Bosler. 8 pp., 2 pls. (Publ. 2323.)

The form and constitution of the earth. By Louis B. Stewart. 14 pp. (Publ. 2324.)

Some remarks on logarithms apropos to their tercentenary. By M. d'Ocagne. 7 pp., 2 pls. (Publ. 2325.)

Modern views on the constitution of the atom. By A. S. Eve. 9 pp. (Publ. 2326.)

Gyrostats and gyrostatic action. By Andrew Gray. 16 pp., 10 pls. (Publ. 2327.)

Stability of aeroplanes. By Orville Wright. 8 pp. (Publ. 2328.)

The first man-carrying aeroplane capable of sustained free flight—Langley's success as a pioneer in aviation. By A. F. Zahm. 6 pp., 8 pls. (Publ. 2329.)

Some aspects of industrial chemistry. By L. H. Baekeland. 25 pp. (Publ. 2330.)

Explosives. By Edward P. O'Hern. 27 pp., 7 pls. (Publ. 2331.)

Climates of geologic time. By Charles Schuchert. 35 pp. (Publ. 2332.)

Pleochroic haloes. By J. Joly. 15 pp., 3 pls. (Publ. 2333.)

The geology of the bottom of the seas. By L. de Launay. 24 pp. (Publ. 2334.)

Recent oceanographic researches. By Ch. Gravier. 10 pp. (Publ. 2335.)

The Klondike and Yukon goldfield in 1913. By H. M. Cadell. 20 pp., 6 pls. (Publ. 2336.)

history of the discovery of sexuality in plants. By Duncan S. Johnson. 4 pp. (Publ. 2337.)

blems and progress in plant pathology. By L. R. Jones. 13 pp. (Publ. 338.)

nt autographs and their revelations. By Jagadis Chunder Bose. 23 pp. (Publ. 2339.)

e National Zoological Park and its inhabitants. By Frank Baker. 34 pp., 11 pls. (Publ. 2340.)

the habits and behavior of the herring gull. By R. M. Strong. 31 pp., 10 ls. (Publ. 2341.)

tes on some effects of extreme drought in Waterberg, South Africa. By Eugène N. Marais. 12 pp. (Publ. 2342.)

mœotic regeneration of the antennae in a Phasmid or walking-stick. By H. O. Schmit-Jensen. 14 pp., 2 pls. (Publ. 2343.)

tent life: Its nature and its relations to certain theories of contemporary iology. By Paul Becquerel. 15 pp. (Publ. 2344.)

e early inhabitants of western Asia. By Felix v. Luschan. 25 pp., 12 pls. (Publ. 2345.)

cavations at Abydos. By Edouard Naville. 7 pp., 3 pls. (Publ. 2346.)

examination of Chinese bronzes. By John C. Ferguson. 6 pp., 14 pls. (Publ. 2347.)

e rôle of depopulation, deforestation, and malaria in the decadence of certain nations. By Felix Regnault. 5 pp. (Publ. 2348.)

e story of the chin. By Louis Robinson. 11 pp., 12 pls. (Publ. 2349.)

cent developments in the art of illumination. By Preston S. Millar. 18 pp., 2 pls. (Publ. 2350.)

e loom and spindle: Past, present, and future. By Luther Hooper. 49 pp., 11 pls. (Publ. 2351.)

e demonstration play school of 1913. By Clark W. Hetherington. 29 pp. (Publ. 2352.)

etch of the life of Eduard Suess (1831–1914). By Pierre Termier. 10 pp. (Publ. 2353.)

Report for 1915.

The report of the executive committee and proceedings of the ard of Regents of the Institution, and the report of the Secretary, th forming part of the Annual Report of the Board of Regents to ngress, were issued in pamphlet form in December, 1915:

port of the executive committee and proceedings of the Board of Regents of he Smithsonian Institution for the year ending June 30, 1915. 21 pp. Publ. 2380.)

port of the Secretary of the Smithsonian Institution for the year ending June 0, 1915. 110 pp. (Publ. 2379.)

Small editions of the following papers, forming the general appen- x of the report for 1915, were issued in May, 1916, and the complete lume was received from the printer in June:

view of astronomy for the year 1913, by P. Puiseux. 9 pp. (Publ. 2383.)

e utilization of solar energy, by A. S. E. Ackermann. 26 pp., 6 pls. (Publ. 2384.)

e constitution of matter and the evolution of the elements, by Ernest Rutherford. 36 pp., 5 pls. (Publ. 2385.)

Submarine signalling, by R. F. Blake. 11 pp. (Publ. 2386.)

The earthquake in the Marsica, Central Italy, by Ernesto Mancini. 4 pp., 1 pl. (Publ. 2387.)

Atlantis, by Pierre Termier. 16 pp. (Publ. 2388.)

Evidences of primitive life, by Charles D. Walcott. 21 pp., 18 pls. (Publ. 2389.)

The place of forestry among natural sciences, by Henry S. Graves. 13 pp. (Publ. 2390.)

Lignum Nephriticum, by W. E. Safford. 28 pp., 7 pls. (Publ. 2391.)

Impressions of the voices of tropical birds, by Louis Agassiz Fuertes. 25 pp., 16 pls. (Publ. 2392.)

The Eskimo Curlew and its disappearance, by Myron H. Swenk. 16 pp., 1 pl. (Publ. 2393.)

Construction of insect nests, by Y. Sjöstedt. 7 pp., 3 pls. (Publ. 2394.)

Olden time knowledge of Hippocampus, by C. R. Eastman. 9 pp., 4 pls. (Publ. 2395.)

Heredity, by William Bateson. 36 pp. (Publ. 2396.)

Some aspects of progress in modern zoology, by Edmund B. Wilson. 14 pp. (Publ. 2397.)

Linguistic areas in Europe: Their boundaries and political significance, by Leon Dominian. 35 pp., 5 maps. (Publ. 2398.)

Excavations at Tell el-Amarna, Egypt, in 1913–14, by Ludwig Borchardt. 13 pp., 13 pls. (Publ. 2399.)

Vaccines, by L. Roger. 8 pp. (Publ. 2400.)

Progress in reclamation of arid lands in the Western United States, by John B. Beadle. 22 pp., 13 pls. (Publ. 2401.)

Some recent developments in telephony, and telegraphy, by Frank B. Jewett. 21 pp. (Publ. 2402.)

Sir David Gill, by A. S. Eddington. 12 pp. (Publ. 2403.)

Walter Holbrook Gaskell, by J. N. Langley. 10 pp. (Publ. 2404.)

Special publications.

The following special publications were issued in octavo form:

Publications of the Smithsonian Institution issued between January 1 and June 30, 1915. Published July 20, 1915. 2 pp. (Publ. 2372.)

Publications of the Smithsonian Institution issued between January 1 and September 30, 1915. October 25, 1915. 2 pp. (Publ. 2377.)

Publications of the Smithsonian Institution issued between January 1 and December 31, 1915. January 27, 1916. 8 pp. (Publ. 2405.)

Publications of the Smithsonian Institution issued between January 1 and March 31, 1916. April 20, 1916. 1 p. (Publ. 2413.)

Classified list of Smithsonian publications available for distribution, October 15, 1915. November 4, 1915. iv+32 pp. (Publ. 2375.)

Opinions rendered by the International Commission on Zoological Nomenclature. Opinion 67. April 27, 1916. Pp. 177–182. (Publ. 2409.)

Rules and regulations for the conduct of the work of the National Advisory Committee for Aeronautics. July 16, 1915. 5 pp.

Sources of nitrogen compounds in the United States. By Chester G. Gilbert. June 30, 1916. 12 pp. (Publ. 2421.)

PUBLICATIONS OF THE UNITED STATES NATIONAL MUSEUM.

The publications of the National Museum are: (*a*) The annual report to Congress; (*b*) the Proceedings of the United States Na-

nal Museum; and (*c*) the Bulletin of the United States National useum, which includes the Contributions from the United States itional Herbarium. The editorship of these publications is vested Dr. Marcus Benjamin.

During the year the Museum published an annual report, 2 lumes of the Proceedings and 52 separate papers forming parts these and other volumes, and 4 bulletins.

The issues of the Proceedings were as follows: Volume 48; volume , papers 2092, 2094 to 2130, and the complete volume; volume 50, pers 2131 to 2138; Annual Report of the United States National useum for 1915.

The bulletins were as follows:

lletin 50, The Birds of North and Middle America, part 7, by Robert Ridgway.

lletin 91, Report on the Turton collection of South African marine mollusks, with additional notes on other South African shells contained in the United States National Museum, by Paul Bartsch.

lletin 92, Bibliographic index of American Ordovician and Silurian fossils (two volumes), by Ray S. Bassler.

lletin 94, Handbook and descriptive catalogue of the meteorite collections in the United States National Museum, by George P. Merrill.

PUBLICATIONS OF THE BUREAU OF AMERICAN ETHNOLOGY.

The publications of the bureau are discussed in appendix 2 of the ecretary's report. The editorial work of the bureau has continued charge of Mr. J. G. Gurley, editor.

During the year, 2 annual reports and 2 bulletins were issued, as llows:

th Annual Report of the Bureau of American Ethnology (containing an accompanying paper, "The Ethnogeography of the Tewa Indians," by John Peabody Harrington).

th Annual Report of the Bureau of American Ethnology (containing two accompanying papers, "Ethnobotany of the Zuni Indians," by Matilda Coxe Stevenson, and "An Inquiry into the animism and folklore of the Guiana Indians," by Walter E. Roth), and a "List of publications of the Bureau of American Ethnology."

lletin 57. An Introduction to the Study of the Maya Hieroglyphs, by Sylvanus Griswold Morley.

lletin 62. Physical anthropology of the Lenape or Delawares, and of the Eastern Indians in general, by Aleš Hrdlička. In press.

REPORT OF THE AMERICAN HISTORICAL ASSOCIATION.

The annual reports of the American Historical Association are ansmitted by the association to the Secretary of the Smithsonian stitution and are communicated to Congress under the provisions f the act of incorporation of the association.

The annual report for 1913 (2 volumes) was published during the year, and the first volume of the 1914 report was in press at the close of the fiscal year.

REPORT OF THE NATIONAL SOCIETY OF THE DAUGHTERS OF THE AMERICAN REVOLUTION.

The manuscript of the Eighteenth Annual Report of the National Society of the Daughters of the American Revolution for the year ending October 11, 1915, was communicated to Congress on March 28, 1916.

THE SMITHSONIAN ADVISORY COMMITTEE ON PRINTING AND PUBLICATION.

The editor has continued to serve as secretary of the Smithsonian advisory committee on printing and publication. This committee passes on all manuscripts offered for publication by the Institution or its branches, and considers forms of routine, blanks, and various other matters pertaining to printing and publication. Eighteen meetings were held during the year and 96 manuscripts were acted upon.

Respectfully submitted.

A. Howard Clark, *Editor.*

Dr. Charles D. Walcott,
Secretary of the Smithsonian Institution.

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REPORT OF THE SECRETARY OF THE SMITHSONIAN INSTITUTION

FOR THE YEAR ENDING JUNE 30

1917

(Publication 2487)

WASHINGTON
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1917

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REPORT

OF THE

ARY OF THE SMITHSONIAN INSTITUTION

CHARLES D. WALCOTT

FOR THE YEAR ENDING JUNE 30, 1917.

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ard of Regents of the Smithsonian Institution:

MEN: I have the honor to submit herewith the customary port on the operations of the Smithsonian Institution and es during the fiscal year ending June 30, 1917, including ed by Congress under the direction of the Board of Regents nited States National Museum, the Bureau of American , the International Exchanges, the National Zoological Astrophysical Observatory, and the United States Bureau ernational Catalogue of Scientific Literature.

eral report reviews the affairs of the Institution proper and nmarizes the operations of its several branches, while the s contain detailed reports by the assistant secretary and ectly in charge of various activities. The reports on opera- e National Museum and the Bureau of American Ethnology e published as independent volumes.

THE SMITHSONIAN INSTITUTION.

THE ESTABLISHMENT.

ithsonian Institution was created an establishment by act ss approved August 10, 1846. Its statutory members are lent of the United States, the Vice President, the Chief nd the heads of the executive departments.

THE BOARD OF REGENTS.

ard of Regents, which is charged with the administration of ution, consists of the Vice President and the Chief Justice nited States as ex officio members, three Members of the ree Members of the House of Representatives, and six citizens, "two of whom shall be residents in the city of Washington and the other four shall be inhabitants of some State, but no two of them from the same State."

In the personnel of the board the only change was the appointment on January 15, 1917, of Hon. Henry White, of Maryland, to succeed Dr. Andrew D. White, of New York, who because of the infirmities of age felt compelled to resign after serving as Regent for nearly 29 years. The roll of Regents on June 30, 1917, was as follows: Edward D. White, Chief Justice of the United States, Chancellor; Thomas R. Marshall, Vice President of the United States; Henry Cabot Lodge, Member of the Senate; William J. Stone, Member of the Senate; Henry French Hollis, Member of the Senate; Scott Ferris, Member of the House of Representatives; Ernest W. Roberts, former Member of the House of Representatives; James T. Lloyd, former Member of the House of Representatives; Alexander Graham Bell, citizen of Washington, D. C.; George Gray, citizen of Delaware; Charles F. Choate, jr., citizen of Massachusetts; John B. Henderson, jr., citizen of Washington, D. C.; Charles W. Fairbanks, citizen of Indiana, and Henry White, citizen of Maryland.

The board held its annual meeting on December 14, 1916. The proceedings of that meeting, as also the annual financial report of the executive committee, have been printed, as usual, for the use of the Regents, while such important matters acted upon as are of public interest are reviewed under appropriate heads in the present report of the secretary. A detailed statement of disbursements from Government appropriations, under the direction of the Institution for the maintenance of the National Museum, the National Zoological Park, and other branches, will be submitted to Congress by the secretary in the usual manner, in compliance with the law.

FINANCES.

By the deposit of $4,000 derived from revenues during the year, the permanent fund of the institution deposited in the Treasury of the United States now amounts to $1,000,000, the limit authorized by Congress, and is divided as follows:

Smithson fund	$727,640.00
Habel fund	500.00
Hamilton fund	2,500.00
Hodgkins fund	216,000.00
Rhees fund	590.00
Avery fund	14,000.00
Addison T. Reid fund	11,000.00
Lucy T. and George W. Poore fund	26,670.00
George K. Sanford fund	1,100.00
Total fund in the Treasury of the United States	1,000,000.00

Other resources.

egistered and guaranteed 4 per cent bonds of the West Shore Railroad Co., part of legacy of Thomas G. Hodgkins (par value)	$42,000.00
oupon 5 per cent bonds of the Brooklyn Rapid Transit Co., due July 1, 1918 (cost)	5,040.63
oupon 6 per cent bonds of the Argentine Nation, due Dec. 15, 1917 (cost)	5,093.75
Total invested funds	1,052,134.38

With the exception of $4,000 deposited in the Treasury, above oted, no other permanent investments were made during the year. 'hese deposits consisted of interest accumulations and rentals only.

The principal revenues of the Institution being collectable July 1 nd January 1 each year, a surplus of cash is accumulated at these imes. Instead of allowing this surplus to be idle in the Treasury, he plan has been adopted to invest such sums as may be spared in ime certificates of deposit issued by strong financial institutions of his city. The rate of interest obtained on these certificates is three er cent per annum and it is believed that approximately $1,000 can e gained each year by this method.

The income of the Institution during the year, amounting to 88,649.52, was derived as follows: Interest on the permanent foundation, $61,490.59; contributions from various sources for specific urposes, $16,630, and from other miscellaneous sources, $10,528.93.

Adding the cash balance of $44,711.02 on July 1, 1916, the total esources for the fiscal year amounted to $133,360.54.

The disbursements, which are given in detail in the annual report f the executive committee, amounted to $124,127.98, leaving a alance of $9,232.56 in cash and on deposit in the Treasury of the nited States June 30, 1917.

In addition to the above specific amounts to be disbursed by the nstitution there was included under the general appropriation for rinting and binding an allotment of $76,200 to cover the cost of rinting and binding the Smithsonian annual report, and reports and iscellaneous printing for the Government branches of the Institution.

The Institution was charged by Congress with the disbursement of e following appropriations for the year ending June 30, 1917.

ternational exchanges	$32,000
ternational exchanges, deficiency act of Apr. 17, 1917	3,500
merican ethnology	42,000
strophysical observatory	13,000
ational Museum:	
Furniture and fixtures	25,000
Heating and lighting	46,000

National Museum—Continued.	
Preservation of collections	300.000
Books	2.000
Postage	500
Building repairs	10.000
National Zoological Park	100.000
International Catalogue of Scientific Literature	7.500
Total	581.500

GENERAL CONSIDERATIONS.

Throughout its history the Smithsonian Institution has constantly cooperated with the executive departments and other establishments of the Government in all matters pertaining to scientific activities. Particularly during the period of the present world war has the Institution been of service in connection with many important measures. Every member of its scientific staff, every one of its 500 or more employees has aided the Nation to the utmost in every possible manner. The laboratories and workshops of the Institution and its branches have been utilized to their fullest extent and routine affairs have taken second place whenever important national matters have needed attention. Your Secretary, as president of the National Academy of Sciences, as chairman of the military committee of the National Research Council, and as chairman of the executive committee of the National Advisory Committee for Aeronautics, has had opportunity to keep in close touch with the needs of the Nation and to give such advice as has been in his power, especially in connection with the development of aeronautics.

The Institution was particularly fortunate in having as former Secretary Prof. S. P. Langley, who in 1896 gave to the world a practical demonstration of the feasibility of mechanical flight by a machine heavier than the air propelled by its own power. To him the Nation to-day owes more than can be told, and as an indication of that debt his memory is fittingly preserved in the name "Langley Field," a tract of some 1,800 acres near Hampton, Va., where extensive experiments of the highest importance to the art of aviation are now being carried on. The Government has now been aroused to the supreme worth of airplanes, machines which Prof. Langley 20 years ago foresaw would be of great service in times of war as well as peace. His prophecy has been fulfilled far beyond his hopes or dreams. The large machine with which his personal experiments ceased in 1903 proved its worth and its capability of actual flight during the past year. Change after change in the design of airplanes to adapt them for scouting, for fighting, and other military purposes has followed in rapid succession until now aerial battles are of daily occurrence and nations are looking ahead to their extended use under peace conditions.

As stated in my last report, the organization of the National Ad-isory Committee for Aeronautics has made unnecessary for the resent the permanent establishment by the Smithsonian Institution f the Langley Aerodynamical Laboratory. Every facility continues, owever, to be afforded to Federal bureaus to study aviation models nd records possessed by the Institution and, in particular, to con-ult the large Smithsonian Library on Aeronautics, together with a eneral card index of aeronautical literature.

There has recently been erected adjacent to the Smithsonian build-ig a temporary structure for the use of the United States Signal ervice especially for housing aeroplanes of various designs and iation appliances.

The executive committee of the National Advisory Committee has eld monthly meetings during the year, and many problems of deep nportance have been discussed.

Upon the recommendation of the committee there was organized y the Council of National Defense the "Aircraft Production Board," to consider the situation in relation to the quantity production of ircraft in the United States and to coöperate with the officers of e Army and Navy and of other departments interested in the roduction and delivery to these departments of the needed aircraft n accordance with the requirements of each department."

The committee also recommended to the Government the adop-on of a continuing program for the training of aviators and the roduction of airplanes and the establishment of schools and an dequate organization and personnel of regular officers, both in e Army and Navy for the efficient use of aircraft and direction f the aviators provided for. As a result of the committee's activi-es the advance in aerial preparedness has been accelerated.

The committee has established a research laboratory at Langley ield, Virginia, for the carrying on of scientific investigations. mong the several subcommittees engaged in the study of aeronautic roblems are those on aerial mail service, aero torpedoes, aircraft ommunicating, airplane mapping, relation of the atmosphere to eronautics, standardization of specifications for aeronautic ma-erials and aeronautic nomenclature, specifications for aeronautic in-ruments, radiator design, motive power, and safe design, construc-on, and navigation of aircraft.

The second annual report of the National Advisory Committee or Aeronautics was published during the year in a volume of 630 ctavo pages, including technical reports on "General Specifications overing Requirements of Aeronautic Instruments," "Nomenclature or Aeronautics," "Mufflers for Aeronautics," "Gasoline Carbureter esign," and "Experimental Researches on the Resistance of Air."

RESEARCHES AND EXPLORATIONS.

The usual activities were continued during the past year in advancing one of the fundamental objects of the Smithsonian Institution, the *increase of knowledge*. In this work various explorations and researches were inaugurated or participated in by the Institution and its branches, covering practically all divisions of astronomical, anthropological, biological, and geological science. The extent of these explorations and researches during the history of the Institution covers a wide range, although a great deal more of most important work could have been accomplished had adequate funds been available. Friends of the Institution have generously aided this work, particularly during the last few years, through the contribution of funds for specific purposes, but much yet remains undone, and opportunities for undertaking important lines of investigation are constantly being lost through lack of means to carry them into execution.

Several proposed expeditions to various parts of the world have been temporarily delayed by the war in Europe.

I will here mention only briefly some of the recent activities of the Institution in these directions, and for details of other researches and explorations may refer to the appendices containing the reports of those directly in charge of the several branches of the Institution and also to the accounts given in the customary pamphlet review of this work published each year in the Smithsonian Miscellaneous Collections.

GEOLOGICAL EXPLORATIONS IN THE CANADIAN ROCKIES.

In continuation of geological work carried on by me for several years past in the Canadian Rocky Mountains, I was engaged during the summer and early fall of 1916 in field investigations on the Continental Divide forming the boundary between Alberta and British Columbia, south of the Canadian Pacific Railway. The very heavy snowfall of the previous winter together with frequent snow and rain squalls during the summer, had made the conditions unusually favorable for taking photographs, the air being exceptionally pure and clear during the field season, conditions, however, very unfavorable for geological investigations. A large number of photographs were secured, including a number of panoramic views made on continuous films eight feet in length.

The sections examined and measured extend from the Mount Assiniboine region southwest of Banff, Alberta, northwest to the Kicking Horse Pass, where the Canadian Pacific Railway has bored a double loop through the mountains on the north and south sides of the pass.

The season's work was undertaken with two principal objects in iew: First, to determine, if possible, the base line of demarcation etween the Lower and Middle Cambrian: and second, to locate the xact horizon of a Cambrian subfauna (*Albertella*) that had in its ntirety been found only in drift boulders in the Kicking Horse Valey east of Wapta Lake.

One of the important incidental results obtained was the discovery at Wonder Pass of a great overthrust fault by which the basal Cambrian rocks forming the mountains on the west side of the pass have been thrust eastward over upon the limestones of the Devonian, shown in the slope on the east side of the pass. The thrust along this fault has carried the rocks forming the main range of the Rockies in this area several miles to the eastward. The fault crosses through Wonder Pass and then curves to the northwest, southeast of Magog Lake, to the great cliff forming the northern extension of the Assiniboine massif. During the million or more years that the agencies of erosion had been wearing away the great mass of rocks above the fault, mountain peaks, canyons, and ridges have been carved and polished by frost, snow, and the grinding force of huge glaciers. The glaciers have now retreated to a point near their origin, high up on the mountains, but they have left behind them basins that are filled with beautiful lakes, such as Magog, Sunburst, and Ross.

The line of demarcation between the Lower and Middle Cambrian was found to be high up in the section on the face of the cliffs at Wonder Pass, and throughout the Assiniboine massif.

While camped on Magog Lake, below Mount Assiniboine, some narvelous reflections of the peak in the waters of the lake were seen n the quiet of the early morning. The changes in the "cloud baniers," at the peak occur very rapidly. These views led us to regard the grand pyramid of Mount Assiniboine as the Matterhorn of America.

Northwest of Banff the broad valley of the Bow has been eroded diagonally back through the massive scarf of the overthrust massif and thus exposed to erosion the heart of the great arch that had its crest over the region now occupied by Mount Victoria and other peaks of the Bow Range.

Some photographic views were secured looking south across the Bow Valley into the heart of the Rockies. A view of Pinnacle Peak tells the story of the tremendous power of erosive agencies, where the olossal quartzites and limestones are shattered and eroded into the most fantastic forms.

West of Pinnacle Peak, at the head of Paradise Valley, Mount Hungabee rises in a terraced wall 4,000 feet above the glacier at its foot, while another glimpse of these great cliffs is seen under Mount

Lefroy, where the melting snows cascade down as a beautiful brook over the quartzite ledges.

At last, in the cliffs above Ross Lake the *Albertella* fauna was located in situ, and from the slopes above the lake a panoramic view was taken of Mount Bosworth, above Kicking Horse Pass on the Continental Divide. Although only 9,083 feet in height, Mount Bosworth exposes in its slopes over 12,000 feet in thickness of bedded rocks that constitute one of the best sections of the Cambrian rocks found in the Canadian Rockies.

Considerable collections of Cambrian fossils were obtained by myself and Mrs. Walcott, who accompanied and worked with me throughout the entire trip, before the storms of late September drove us back to Banff and ended the research for the season.

Many of the photographs taken in this wonderful region are reproduced in one of the publications of the Institution.[1]

GEOLOGICAL FIELD STUDIES.

Dr. George P. Merrill, head curator of geology in the National Museum, devoted several days of the summer vacation period in 1916 to visiting the gem and feldspar quarries of Auburn, Topsham, and neighboring areas in Maine. While nothing new was secured, he was able to add interesting material to the Museum exhibit illustrating the character and association of the pegmatite dikes, which is now being installed in the Museum.

HUNTING GRAPTOLITES IN THE APPALACHIAN VALLEY.

The great value of the extinct organisms known as graptolites in determining the age of geological formations which contain few and often no other kinds of fossils, has been proved time and again. During the summer of 1916 Dr. R. S. Bassler and Mr. C. E. Resser, both of the division of paleontology, United States National Museum, had occasion to test this particular group of fossils in the course of a study of the Cambrian and Ordovician shale formations of western Maryland. They report that—

> Recent excavations along the Western Maryland Railroad, in the great shale belt just west of Williamsport and extending north and south for hundreds of miles, exposed these rocks to such advantage that it was thought possible enough fossils could be found in them to determine their exact geologic age and structure. However, no fossils of any kind were found after much search. It was then decided that the rocks were either barren of organic life or the cleavage produced in the strata by the great forces resulting in their present folded condition destroyed all traces of fossils.
>
> Finally a fold of black shale was observed and at the point where the cleavage and the bedding planes coincided, abundant graptolite remains were

---

[1] Smithsonian Miscellaneous Collections, vol. 66, No. 17, 1917.

d. The species which were collected proved to be of such typical
forms that there could be no doubt of the Middle Ordovician age of
ticular shale. Limestones known to be much older outcrop so short
ce to the east of this that a great fault or displacement between the
ls of rocks is clearly indicated.

these facts in hand, the fault was traced for a distance of 30 miles
d south, thus again showing that the graptolites proved the key to the
structure of the region.

TIONS IN THE OHIO VALLEY FOR FOSSIL ALGAE AND CORAL REEFS.

ugh the extensive studies of the Secretary for several years
e collections of the National Museum are rich in limestone-
g pre-Cambrian algae—a low order of water plants that
lime or silica. An instructive series of these fossils has been
on exhibition, but in order to show the geologic occurrence
lution of this group of plants it was necessary to supplement
-Cambrian forms with specimens of more recent age. Ac-
ly Dr. R. S. Bassler, curator of paleontology, spent some
in the Ohio Valley, particularly in the blue grass region of
ky, in a search for large exhibition specimens, and in a study
mode of occurrence. He was successful in procuring a num-
showy exhibition specimens as well as numerous study collec-

difficult, however, was the discovery and quarrying of a
oral reef suitable for exhibition in the Museum. Coral reefs
own at several horizons in the Paleozoic rocks of the Ohio
but they are seldom so exposed that an instructive section
quarried out without injury to the specimens. A great reef of
outcrops in the strata along the banks of Chenoweth Creek at
ontown, near Louisville, Ky., and this was selected to furnish
ibit for the Museum. A section of the stratified rocks 6 feet
ect was bodily quarried out of the bank, and these strata with
ontained corals were later set up in the exhibition hall of
tology.

lowest layer of limestone is composed largely of fossil brachi-
nells. Next above is a layer with scattered corals belonging to
tubed species (*Columnaria calcina* Nicholson), probably torn
es from a near-by coral reef. Overlying this is a limestone
n largely made of the twiglike stems of stony Bryozoa (Tre-
ata).

main reef of corals is chiefly composed of the rounded heads
e species of honeycomb corals, some with radial partitions in
es (*Columnaria alveolata* Goldfuss), others without such par-
(*Columnaria vacua* Foerste), and still others with spongy
(*Calapoecia cribriformis* Nicholson). Large stems of fluted or

nodular Hydrozoa (*Beatricea*) are scattered among the honeycomb coral masses.

Horn corals (*Streptelasma rusticum* Billings) are to be seen in both the lower and upper coral beds. The spaces between the limestone layers and also between the heads of coral were filled with clay which contained many other examples of fossil life.

Another coral reef in central Kentucky composed of a single species (*Stromatocerium pustulosum* Safford) was investigated and several massive and complete specimens excavated for exhibition. The smallest of these was several feet in diameter. These conical coral masses are restricted to a single layer of limestone, on which account they serve to identify the bed from place to place. This coral reef occurs in the Trenton limestone and fine outcrops occur around Lexington, Ky., and it has been noted at many localities in central Kentucky and central Tennessee.

EXAMINATION OF ANCIENT HUMAN REMAINS IN FLORIDA.

A good deal of public and scientific interest was aroused by the finding of human remains in Florida under conditions which seemed possibly to indicate extreme age. It was therefore desirable that a critical examination be made of the bones and their environment. Accordingly, on the invitation of Dr. E. H. Sellards, State geologist of Florida, and as his guest, Dr. Hrdlička, of the United States National Museum, spent four days in the latter part of October, 1916, at Vero, Fla., where his time was devoted to the study of the site from which certain human bones described by Dr. Sellards were obtained, and to a preliminary examination of the bones themselves.

Dr. Hrdlička reports as follows:

> Laborers were engaged, and with their help there was made a clean exposure about 160 feet in length of the geological deposits in close proximity to the localities where the human bones had been discovered. This afforded a comprehensive and enlightening view of the formations involved.
>
> The two human skeletons had been found in the south bank of a recently excavated drainage canal. They occurred one in fairly close proximity to, and the other within the broad, shallow bed of, a small fresh-water stream, now drained by a lateral cut from the canal. The former lay in dark and somewhat indurated sands, the latter for the most part at the base of the muck deposit of the stream bed, and between this and the next older stratum. A few smaller bones, which probably belonged to the second skeleton, were found at about the same level a short distance from the rest of the remains in an elevation of the lower sandy layer.
>
> The first skeleton lay at a depth of 2½ feet, the second at a depth of 2 to 3½ feet from the surface. The deposits above the first skeleton consisted partly of somewhat indurated and partly of ordinary sands, overlaid by a layer of marl. The marl when freshly exposed was found to be of the consistency of fresh mortar, but on longer exposure hardened to fairly solid rock. Above skeleton No. II there was only muck and irregular sandy patches.

Skeleton No. I is that of a woman, probably adult; skeleton No. II that of an adult man of somewhat advanced years. The bones of the former lay close together, those of the latter were dissociated though lying within a moderate-sized ellipse. Broken pottery, bone and stone implements, and stone chips, were found in the same strata, more particularly in the muck layers, with the human bones.

Besides the two skeletons, single bones of three additional human bodies—one a child, one a young person, and one adult—were discovered in the vicinity.

The human bones were considerably mineralized, and in the same strata in which they occurred are found many bones of long-extinct animals, such as mastodons, tapirs, etc.

Due to the presence of the fossil animal bones in the same strata with the human remains, and to the mineralization of the latter, the opinion was advanced that the human remains were of the same age as the animal bones, which would relegate them to the early part of the Quaternary.

This is not sustained by an anthropological study of the case and of the remains. The human bones show no signs of weathering, gnawing, or trampling, and the two skeletons were represented by so many parts that the only satisfactory explanation of the conditions can be found in the assumption that the remains are those of intentional burials.

The pottery and the bone and stone implements are all identical with similar artifacts of the Florida or southeastern Indians, while the human bones themselves show, without exception, modern features, with numerous characteristics which permit their identification also as Indian.

The conclusions arrived at are that the Vero finds represent another of those cases, which are bound to occur from time to time, where the circumstances seem to point to antiquity of the human bones, but where a thorough, all-sided inquiry shows that the mass of the evidence is decisively against such an assumption.

Following the visit to Vero, Dr. Hrdlička made a trip to Fort Myers, Fla., and to several of the outlying keys, where human remains were reported. The particular object of this trip was to visit a small island off Fort Myers known as the Demorest or Demere Key, on which, according to information obtained from Mr. Sam L. King, of Bristol, Tenn., human bones could be found "imbedded in concretionary materials." Concerning these remains Dr. Hrdlička says:

Demere Key, the surface of which measures about 15 acres, was originally a low and swampy island, like all of the small keys in the vicinity, but a larger part of its surface was in the course of time artificially elevated by the Indians, by means of shells, sand, and soil, for the purpose of habitation and cultivation. Along the middle of this large artificial elevation runs a remarkable platform about 80 feet long, the eastern boundary of which is supported by a still fairly well preserved, well-made wall of conch shells. This structure has been briefly reported by Cushing and by Mr. Clarence B. Moore, but its origin is in doubt. At a short distance northeast of this elevation there is a low, irregular heap which contains numerous Indian burials. On examining the surface of this heap it was found to consist of shells, detritus, sand, and vegetable matter, and to be everywhere more or less consolidated to the depth of from 6 to 18 inches. The consolidation was such that in many places it was very hard to penetrate the crust with an ordinary mattock. Within this crust, on breaking parts of it off and turning them over, were found numerous human bones, including some more or less defective skulls. Beneath the crust was white sand, which also contained many bones, with a few Indian ornaments and fragments of pottery. The consolidated crust differed in composition. For the larger part it was coquina, of just about such a composition as beach accumulations along the sea; but in other places the solidified part consisted almost entirely of white sand, while in still others it was a dark concretionary mass enclosing shells, sand, and vegetable matter, besides the bones. The human bones, though evidently more or less changed, were not yet petrified; and the mound as a whole appears to have no claim to antiquity greater than perhaps a few hundred years; but its surface offers a fine example of what favorable conditions can accomplish in no great space of time in the way of consolidation and inclusion into rock of human remains.

BIOLOGICAL WORK IN CUBA AND HAITI.

Mr. John B. Henderson, a Regent of the Institution, and Dr. Paul Bartsch, curator of marine invertebrates, spent the last half of March in the region about the Guantanamo Naval Station in eastern Cuba, collecting a large quantity of very interesting land shells, birds, plants, fossils, and marine invertebrates. The month of April was spent in Haiti, where they thoroughly explored the Cul-de-Sac region, the north coast of the western peninsula, and the coastal range from the Cul-de-Sac north as far as San Marcos. They secured many interesting specimens of land and fresh water mollusks, several new birds, some very interesting cacti and other plants, and a general invertebrate collection from this much neglected island. A large series of interesting photographs was also made, many of which will be used in a report on the expedition which the explorers hope to publish in the near future.

BOTANICAL EXPLORATIONS IN THE HAWAIIAN ISLANDS.

During the summer of 1916, from June to November, Mr. A. S. Hitchcock, custodian of the section of grasses of the division of plants in the National Museum, traveled in the Hawaiian Islands studying and collecting the flora, especially the grasses. Concerning his explorations Mr. Hitchcock says:

> The islands are all of volcanic origin and the rock is lava except a very little that is coral formation. Kauai, the geologically oldest island, shows the greatest effect of erosion, the deep canyons rivaling in beauty the Grand Canyon of the Colorado. On the island of Hawaii are the two highest peaks of the group, Mauna Kea, 13,825 feet, and Mauna Loa, 13,675 feet in height. Above 10,000 feet there is scarcely any vegetation upon these peaks, especially upon Mauna Loa, which is made up of comparatively recent lava.
>
> The important agricultural industries are the raising of sugar, live stock, and pineapples. The cultivated trees and shrubs are of great variety and beauty, and are drawn from all tropical and subtropical lands. One of the introduced trees of great economic importance is the algaroba tree, or kiawe, as the Hawaiians call it. It is found in a belt on the lowlands along the shores of all the islands and occupies the soil almost to the exclusion of other plants.

he pods are very nutritious and are eagerly eaten by all kinds of stock. The owers furnish an excellent quality of honey. The prickly pear cactus has ecome extensively naturalized in the dryer portions of all the islands. The anchmen utilize this for feed when other kinds become scarce, the cattle eating he succulent joints in spite of the thorns. Two introduced shrubs now occupy xtensive areas and have become great pests. These are guava, whose fruit urnishes the delicious guava jelly, and lantana, with clusters of handsome arti-colored flowers.

The indigenous flora is highly interesting though not abundant in species. wo of the commonest trees are the ohia and the koa. The former, also called hia lehua and lehua, resembles, in the appearance of the trunk, our white ak, but bears beautiful clusters of scarlet flowers with long-protruding tamens. The koa produces a valuable wood much used in cabinetmaking, now ecoming familiar through its use for making ukuleles. Among the peculiar plants of the islands is the silversword, a strikingly beautiful composite with glistening silvery leaves, which grows only on the slopes of cinder cones in the crater of Haleakala and in a few very limited localities on Hawaii. The family Lobeliaceae is represented by about 100 species belonging to 6 genera. The numerous arborescent species are very peculiar and characteristic. Many of them form slender trunks like small palms, crowned with a large cluster of long narrow leaves. The trunks of some species are as much as 30 or 40 feet high, and the large bright colored flowers are sometimes remarkably beautiful.

The indigenous grasses of the Hawaiian Islands are not numerous. Three peculiar species of Panicum inhabit the open bogs formed on the tops of many of the high mountains in the wet zone such as Mount Eeka and Mount Kukui in West Maui, some of the peaks of Molokai and Oahu, and Waialeale in Kauai, that upon the latter covering in all several square miles. These bogs are found near the summits of ridges in the regions of heavy rainfall, are devoid of trees and shrubs, and harbor a peculiar vegetation.

CINCHONA BOTANICAL STATION.

Recently the Institution has acquired a three years' lease of the Cinchona Botanical Station at Jamaica, comprising about 10 acres of land, with offices, laboratories, and other buildings, for the furtherance of our knowledge of West Indian botany. Assignment of botanists who desire to prosecute studies there are made on the recommendation of organizations which have cooperated with the Institution in securing the use of this important field for botanical investigations.

BIOLOGICAL WORK IN CHINA.

Mr. Arthur deC. Sowerby has continued his work in northeastern China though conditions have been so unsettled as to make collecting extremely difficult. A shipment of natural history specimens to the Museum from Mr. Sowerby received May 27, included 186 bird skins, 44 mammals, 1 reptile, 16 fishes, and other miscellaneous natural history objects.

EXPLORATIONS IN SANTO DOMINGO.

Dr. W. L. Abbott, whose energies for nearly 30 years past have been devoted to explorations in the Old World, made a short visit to Santo Domingo (the scene of his earliest expedition, in 1883), where he spent a few weeks in late summer and fall, 1916, at the eastern end of the island, chiefly in the vicinity of the Bay of Samana, with trips to several localities in the highlands of the interior, notably at Constanza and El Rio. On this expedition he made a very interesting collection of mammals, birds, reptiles, mollusks, insects, and Indian relics.

In the coast region, Dr. Abbott investigated numerous caves in search of remains of an extinct mammalian fauna. One of the most interesting mammals whose remains were found in these caves is a large rodent, described from a freshly killed specimen in 1836, but not captured since then. Whether it is extinct or not is at present an uncertainty. At San Lorenzo Bay, on the south side of the Bay of Samaná, there are "many precipitous limestone hills," which. Dr. Abbott writes, are "literally honeycombed with caves. The cave (usually inhabited) near the pier of the abandoned railroad is full of shell heaps, and contains many Indian carvings, more or less obliterated by smoke and lime deposits." Here he uncovered two hundred or more archeological objects, including terra-cotta images, fragments of pottery, stone pestles, carved stone plates, and similar material.

After exhausting the caves in the vicinity of Samaná, Dr. Abbott visited the mountains of the interior, where, at El Rio, he made a most surprising discovery in the bird fauna. He writes "I had heard of a very small 'parrot' which lived in flocks in the pines on the pine cones. I suspected a crossbill—said to occur here at Jarabocoa, below 2,000 feet, but the pair I shot were at near 5,000 feet." The bird proved to be a veritable crossbill and, what was most extraordinary, a form closely related to the white-winged crossbill, a species restricted in the breeding season to the Boreal zone of North America (from Alaska to the higher Adirondacks), migrating in winter at rare intervals as far south as North Carolina.

The series of birds totaled about 250 specimens, of 50 or more species, over 30 of which are peculiar to the island. The indigenous species of this island have long constituted the Museum's chief desiderata among the birds of the West Indies, hence Dr. Abbott's collection has proved of great interest, aside from the special discoveries mentioned above.

EXPEDITION TO CELEBES.

Through the generosity of Dr. W. L. Abbott, associate in zoology in the Museum, Mr. H. C. Raven has continued to make natural history and ethnological collections in Celebes. In April the Museum received a shipment of ethnological objects from Mr. Raven, including native fish traps, baskets, cloth, rope, hats, dishes, blowguns used for hunting birds, and a curious native musical instrument.

COLLINS-GARNER CONGO EXPEDITION.

Early in 1917 an expedition with the title of the Collins-Garner Congo expedition in the interests of the Smithsonian Institution, left for the French Congo and neighboring parts of west Africa. Mr. C. R. W. Aschemeier, of the department of biology, National Museum, is representing the Smithsonian Institution and the Museum as natural history collector. All of the natural history specimens collected by the expedition will come to the National Museum. The other members of the expedition are Mr. Alfred M. Collins, of Philadelphia, chief; Prof. Richard L. Garner, of New York, who is making special studies concerning apes and monkeys, manager; and Prof. Charles W. Furlong, of Boston, scientist, artist, and explorer.

RESEARCH CORPORATION.

In my annual reports for several years past I have called attention to the Research Corporation organized in 1912 under the laws of New York State, and having as its officers and directors a group of men particularly interested in the development of the industrial arts. The present Secretary of the Smithsonian Institution is one of the directors and a member of the executive committee. The certificate of incorporation declares it to be the purposes of the corporation to—

> Provide means for the advancement and extension of technical and scientific investigation, research, and experimentation by contributing the net earnings of the corporation over and above such sum or sums as may be reserved or retained and held as an endowment fund or working capital, and also such other moneys and property belonging to the corporation as the board of directors shall from time to time deem proper, to the Smithsonian Institution, and such other scientific and educational institutions and societies as the board of directors may from time to time select, in order to enable such institutions and societies to conduct such investigation, research, and experimentation.

The principal income of the corporation is at present derived from royalties for the use of the Cottrell process for the electrical precipitation of suspended particles. Dr. F. G. Cottrell, the inventor of this process, offered his patents to the Smithsonian Institution, but since it was not practicable for the Institution to administer them commercially, the Research Corporation was organized for that purpose. The process is now in successful use by a score of smelting and refining companies and other industrial plants and the financial condition of the corporation is very gratifying.

The corporation seeks to do for industrial arts what some other institutions are now doing for the sciences generally, for medicine, and for the improvement of social conditions. There has now been established an annual fellowship "open to general competition for the purpose of encouraging and assisting scientists in the prosecution of their investigations. To the successful competitor, the corporation offers an honorarium of twenty-five hundred dollars and the assistance of the corporation in securing the most favorable opportunity for prosecuting the particular object of study."

The Cottrell process in operation has been described in publications of the Smithsonian Institution. The precipitation processes and their applications have been briefly described as follows:

> Electrical percipitation consists of the removal of suspended particles from gases by the aid of electrical discharges. The precipitation process operates by passing the gases carrying the suspended, finely divided particles between two systems of electrodes, one of which is made to carry a negative electrical charge while the other carries a positive charge. In ordinary practice the negative electrodes are small in size, such as iron wires or chains, and the positive electrodes are large, such as iron plates or pipes. The gases are divided into several channels and passed through the space between the wires and the plates or pipes, in the latter case each pipe having a wire placed along its longitudinal axis. The electrodes are charged by being connected with a source of high voltage electricity, consisting ordinarily of a high voltage transformer for increasing the electric potential up to the working voltage which varies with the size and character of the installation from 20,000 to 100,000 volts; a rectifier for changing alternating current into direct current, and a switchboard provided with the necessary standard control equipment. The suspended particles while passing between the electrodes become electrically charged and are then driven to the plates or the inner surface of the pipes by the forces of the electric field. A common example of the application of the process is the precipitation of minute particles containing copper, silver, gold, lead, zinc, and other valuable metals ordinarily carried away from smelting and refining furnaces which may by this process be recovered from such gases without interfering with the operation of the plant. The recovered dust or fume, in such cases, is often valuable and constitutes a large financial saving. In many other industrial operations where noxious gases, fumes, or dusts are given off, the process has been successfully applied, some of the materials precipitated being sulphuric, nitric, and hydrochloric acids; arsenic, bleaching powder, lead, zinc, and other poisonous materials.

NATIONAL RESEARCH COUNCIL.

As stated in my last report, the National Research Council was organized by the National Academy of Sciences, the President of the United States appointing the representatives of the Government and authorizing the appointment of other members by the president of the academy. There was thus brought together about 50 members representing various branches of science, and they were subdivided in several subcommittees. Joint committees were also formed in peration with national scientific societies. The Research Council since become a part of the Council of National Defense and rates in coordination with that body. In the membership of the search Council are several of the scientific staff of the United ites National Museum, your Secretary being vice chairman of the incil and chairman of the military committee.

With the preparations for actual participation by the United ates in the world war, the council became an important factor in scientific work of the Government. On February 29, 1917, the uncil of National Defense adopted the following resolution:

Resolved, That the Council of National Defense, recognizing that the National search Council, at the request of the President of the President of the United ates, has organized the scientific forces of the country in the interest of tional defense and national welfare, requests that the National Research uncil cooperate with it in matters pertaining to scientific research for national fense; and to this end the Council of National Defense suggests that the ational Research Council appoint a committee of not more than three, at ast one of whom shall be located in Washington, for the purpose of maintaing active relations with the director of the Council of National Defense.

Since that time the National Research Council has served as the epartment of science and research of the Council of National efense and in such capacity has been charged with the organiation of scientific investigations bearing on the national defense nd on industries affected by the war.

Shortly after this action Dr. George E. Hale, chairman of the ouncil, initially undertook the organization of research activities direct cooperation with the United States Government and its arious departments. Office accommodations were provided for emistry, engineering, medicine and hygiene, and physics commites of the council, and arrangements were made to provide such commodations also for the agriculture and psychology committees. r. Robert A. Millikan, chairman of the physics committee, was ppointed vice chairman of the council and consented to give his tire time, upon leave of absence from the University of Chicago, work in Washington as the executive officer of the council. Offices New York were retained with the secretary, Dr. Cary T. Hutchinn, in charge.

Particular mention may perhaps be made of the appointment of foreign service committee of the council and of its important ission and work as a direct aid in acquainting investigators in is country with the scientific problems which have been confronted oth in military and industrial pursuits in England and France.

Two other committees of the council have been especially organed as the result of the cooperation brought about with the Council f National Defense; one a committee on navigation and nautical instruments, appointed upon the request of the General Munit Board and the other a committee on relations with State rese councils, appointed to consider and report upon desirable mean cooperation between the Council and State research committees.

OFFICERS OF THE COUNCIL.

George E. Hale, chairman; Charles D. Walcott, first vice chairman; Dunn, second vice chairman; R. A. Millikan, third vice chairman and exec officer; Cary T. Hutchinson, secretary.

EXECUTIVE COMMITTEE.

J. J. Carty, Chairman.

Marston T. Bogert.
Russell H. Chittenden.
Edwin G. Conklin.
Gano Dunn.
George E. Hale.
Van H. Manning.
R. A. Millikan.
Arthur A. Noyes.
Raymond Pearl.
Michael I. Pupin.
S. W. Stratton.
Victor C. Vaughan.
Charles D. Walcott.
William H. Welch.

The following members and new committees have been added the council since my last report:

LIST OF NEW MEMBERS.

Carl L. Alsberg.
Joseph S. Ames.
Admiral William S. Benson.
Walter B. Cannon.
John M. Clarke.
Howard E. Coffin.
William M. Davis.
Arthur L. Day.
Henry H. Donaldson.
William F. Durant.
Rear Admiral Ralph Earle.
John R. Freeman.
Hollis Godfrey.
Rear Admiral Robert S. Griffin.
Herbert C. Hoover.
Franklin H. Martin.
John C. Merriman.
Eliakim H. Moore.
Frederick H. Newell.
George O. Smith.
Lewis B. Stillwell.
Robert W. Wood.

LIST OF COMMITTEES.

Military committee.
Agriculture committee.
Committee on Anthropology.
Botany committee.
Chemistry committee.
Food committee.
Committee on gases used in warfare.
Committee on Industrial Research.
Committee on Medicine and Hygiene.
Committee on Optical Glass.
Physiology committee.
Committee on Relations with State Research Councils.
Aeronautics committee.
Anatomy committee.
Astronomy committee.
Committee on census of research.
Engineering committee.
Foreign service committee.
Geography committee.
Geology and paleontology committee.
Mathematics committee.
Committee on navigation and nautical instruments.
Physics committee.
Psychology committee.
Committee on research in educational institutions.
Zoology committee.

Since the close of the year the Signal Corps, desiring to avail itself
the assistance of the National Research Council, appointed Dr.
A. Millikan, third vice chairman and executive officer, and Dr.
arles E. Mendenhall majors in the United States Army.

PUBLICATIONS.

The Institution proper issues three series of publications: Smith-
nian Contributions to Knowledge, Smithsonian Miscellaneous Col-
tions, and Smithsonian Annual Reports. The publications of the
rious branches of the Institution issued under its direction include
e Annual Reports, Proceedings, and Bulletins of the United States
ational Museum. including the Contributions from the National
erbarium; Annual Reports and Bulletins of the Bureau of Amer-
an Ethnology; and the Annals of the Astrophysical Observatory.
ll of the publications of these branches and the Annual Report of
e Institution are printed by means of Congressional allotments.

Smithsonian Contributions to Knowledge.—Of this series, which
ntains in quarto form the results of studies constituting important
ntributions to knowledge, one memoir was published, entitled "A
ontribution to the Comparative Histology of the Femur," by Dr.
. S. Foote, of Creighton Medical College, embodying the results of
he author's work for a number of years on this subject.

Smithsonian Miscellaneous Collections.—Of this series, 19 papers
orming parts of five volumes were issued, including three papers by
our secretary containing the results of his field work in Cambrian
eology. The annual Smithsonian exploration pamphlet appears
n this series, which describes briefly the work in the field of the
mithsonian scientists and scientific expeditions, illustrated by pho-
ographs taken by the explorers in every quarter of the globe. The
ecessity for a second reprinting of the sixth revised edition of the
mithsonian Physical Tables indicates the continued usefulness of
is work. In this series also appeared the important paper by H.
elm Clayton on the effect of variations in solar radiation on the
rth's atmosphere, the possibilities of which for use in forecasting
mperature are discussed elsewhere in this report.

Smithsonian report.—As stated in the report on the publications,
ppendix 8, although the final proof of the 1916 report was returned
the printer in April, the books were not received before the close
the year because of the great rush of war printing at the Govern-
ent Printing Office.

Special publications.—Among the special publications may be men-
oned an illustrated folder describing the Smithsonian and its
ranches, for the use of visitors and correspondents.

National Museum publications.—The Museum issued during the year 1 volume of the proceedings, 73 papers forming parts of this and other volumes, and 6 bulletins.

Bureau of Ethnology publications.—The Bureau of American Ethnology published 1 annual report, 2 bulletins, and a list of publications of the bureau.

Reports of historical and patriotic societies.—In accordance with a provision in the charters of the American Historical Association and the National Society of the Daughters of the American Revolution, the annual reports of those organizations were submitted to your secretary, and communicated by him to Congress.

Allotments for printing.—The allotments for the printing of the Smithsonian report and the various publications of the branches of the Institution were practically used up, a small balance remaining in one or two cases owing to the impossibility of getting certain publications off the press before the close of the year.

The allotments for the year ending June 30, 1918, are as follows:

For the Smithsonian Institution: For printing and binding the annual reports of the Board of Regents, with general appendices, the editions of which shall not exceed 10,000 copies	$10,000
For the annual reports of the National Museum, with general appendices, and for printing labels and blanks, and for the bulletins and proceedings of the National Museum, the editions of which shall not exceed 4,000 copies, and binding, in half morocco or material not more expensive, scientific books, and pamphlets presented to or acquired by the National Museum library	37,500
For the annual reports and bulletins of the Bureau of American Ethnology and for miscellaneous printing and binding for the bureau	21,000
For miscellaneous printing and binding:	
International Exchanges	200
International Catalogue of Scientific Literature	100
National Zoological Park	200
Astrophysical Observatory	200
For the annual report of the American Historical Association	7,000
Total	76,200

Committee on printing and publication.—The Smithsonian advisory committee on printing and publication considers all manuscripts offered for publication by the Institution or its branches. During the past year 16 meetings were held, at which 101 manuscripts were considered and acted upon. The membership of the committee was as follows: Dr. Leonhard Stejneger, head curator of biology, National Museum, chairman; Dr. C. G. Abbot, director of the Astrophysical Observatory; Mr. Ned Hollister, superintendent of the National Zoological Park; Mr. A. Howard Clark, editor of the Institution, secretary of the committee; Mr. F. W. Hodge, ethnologist in charge of the Bureau of American Ethnology; and Dr. George P. Merrill, head curator of geology, National Museum.

LIBRARY.

The main purpose of the library of the Smithsonian Institution s been to assemble a collection of periodicals and publications of scientific nature as well as the journals and other publications the scientific institutions and learned societies of the world, the hole to be a library of reference for research in the broadest nse. In carrying out this policy an accumulation of over half a illion titles has been made, the main part of which is housed in e Library of Congress with the designation of the Smithsonian eposit of the Library of Congress. In addition to this main part the Smithsonian library there are maintained a number of smaller raries at the various branches of the Institution, the National useum library, the Bureau of American Ethnology library, the strophysical Observatory library, and the National Zoological Park rary. In the various offices of the Institution and the Museum ctional libraries of technical works in all branches of science are aintained for the use of the scientific staff. There are 35 of these ctional technical libraries.

The accessions to the libraries of the Institution and its branches uring the year aggregated more than 9,000 volumes, parts of olumes, and pamphlets. Among important gifts during the year as a first consignment of 561 volumes and 293 pamphlets, part of he botanical library of Dr. John Donnell Smith, of Baltimore; the hole of which, amounting to 1,500 volumes, he has offered to the nstitution.

In the Museum library, 1,572 volumes and 3,556 pamphlets were ccessioned during the year, among them the scientific library of Dr. dgar A. Mearns, associate in zoology, who died last fall. This ollection is rich in works on mammals, birds, and plants. Through he continued generosity of Dr. William H. Dall, honorary curator f mollusks, the sectional library of the division of mollusks has een enriched by the addition of 307 titles during the year.

RECEPTION IN HONOR OF FRENCH SCIENTISTS.

On the evening of June 14, under the auspices of the National cademy of Sciences, a reception was held in the Smithsonian buildig for the members of the French Scientific Mission to the United tates. Prof. Charles Fabry told of what France is doing in the war; ommander Bridge spoke of Great Britain's work in submarine warire; and Sir Ernest Rutherford sketched the situation as England es it. President Walcott, of the National Academy of Sciences, and rs. Walcott were assisted by Lieut. Maurice Paternot, Prof. Charles abry, and Prof. Henri Abraham in receiving the guests.

NATIONAL MUSEUM.

One of the most important features to be recorded in the operations of the National Museum during the year was the actual beginning of the building for the Charles L. Freer Art Collections. Excavation was started on October 2, 1916, and by June 30, 1917, the foundations and concrete walls inclosing the subbasement had been completed. The structure, covering 228 by 185 feet, will be of Milford granite and in exterior and interior design best adapted to its purpose. Assistant Secretary Rathbun in the appendix to the present report gives some interesting details regarding this addition to the Smithsonian group of buildings. The construction of this art building is made possible through the most generous gift of $1,000,000 by Mr. Freer for the housing and study of the magnificent collection he has presented to the Nation. His gift of the building and collection is the most valued donation which any individual has ever made to the Government.

The accessions to the National Museum collections during the year aggregated about 200,000 specimens pertaining to anthropology, zoology, botany, geology and mineralogy, paleontology, textiles and woods, mineral technology, and objects of art. In his report Assistant Secretary Rathbun enumerates the sources and importance of these accessions, so that it is not necessary here to do more than to mention some of the principal items. Interesting collections of anthropological objects were received from the island of Celebes, gathered at the expense of Dr. W. L. Abbott, who for many years has most generously contributed toward the growth of the Museum in ethnological and biological material from various parts of the world. Dr. Abbott personally visited the West Indies during the year and met with gratifying success in adding to our knowledge of the early history of man and of the fauna of that region. A large collection of stone implements belonging to the ancient town builders of Mexico was received through Capts. Wright and Cooper of Gen. Pershing's expedition, and extensive archeological collections from the Southwestern States were gathered by Dr. Fewkes and others connected with the Bureau of American Ethnology. Hundreds of objects of great value in the study of physical anthropology came to the museum as the result of explorations by Dr. Hrdlička and others in Peru.

To the division of American history memorials were added pertaining to eminent military and naval men and other prominent Americans and objects commemorative of historic events, besides costumes, furniture, and other articles illustrative of colonial and later periods.

Although the Museum is without funds for carrying on extended biological explorations, yet through the generosity of friends it has been greatly enriched by the results of field work in various parts of the world, particularly the work of Dr. W. L. Abbott so often mentioned heretofore. A large and fine collection of reptiles and batrachians came as a bequest by the late Julius Hurter, sr., of St. Louis.

To the botanical collections were added about 25,000 specimens and the remnant of the botanical library saved from the flood which so nearly destroyed the Vanderbilt Herbarium at Biltmore, N. C., in July, 1916. These objects were presented by Mrs. Vanderbilt. Prof. O. F. Cook gave to the Museum about 15,000 specimens of cryptogams gathered in the United States and Liberia.

In geological material, likewise, and in the department of textiles, mineral technology, and other divisions of the Museum, there were important additions described by the assistant secretary.

The attendance of visitors to the Natural History building aggregated about 400,000 and the Arts and Industries building about 250,000.

In calling attention to the present needs of the Museum, I may mention the fact that on account of the great growth of the collections during the last few years there is already presented a lack of exhibition and storage facilities in some of the departments, particularly in connection with the applied arts, the fine arts, and American history. It is exceedingly gratifying that the accessions should increase in such great proportions from year to year, but it is likewise important that there be a corresponding increase in the number of the scientific staff and other employees necessary for the proper care and study of this mass of material made up in great measure through gifts by the people of the Nation.

BUREAU OF AMERICAN ETHNOLOGY.

The Bureau of American Ethnology, which conducts ethnological researches among the American Indians and the natives of Hawaii, is under the direction of Mr. F. W. Hodge, whose report is given in Appendix 2.

Among the important researches of the year was the excavation and study of Hawikuh, a large reservation on the Zuñi Reservation in western New Mexico. This work was carried on by Mr. Hodge in cooperation with the Museum of the American Indian, Heye Foundation, of New York City. The purpose of the excavation of Hawikuh was to study a Zuñi pueblo, known to have been inhabited from prehistoric times well into the historic period, to determine as far as possible the character and arts of the Zuni people in early times, as well as the effect of Spanish contact during the sixteenth and seventeenth centuries. The results of this important study, which were highly successful, will be published in the near future.

In the Mesa Verde National Park Dr. J. Walter Fewkes excavated and repaired a large rectangular ruin, 100 by 113 feet, to which he gave the name of Far View House, by reason of its commanding situation on the mesa. The most important result of the study of this structure is the revelation of a new type of Mesa Verde building, the form and character of which throws light on the close relation of pueblos and cliff dwellings. Dr. Fewkes believes that this structure is the only example of a pure type of pueblo ever completely excavated, the term "pure type" meaning a terraced community building constructed of shaped stones and having circular kivas, or ceremonial rooms, united with surrounding rectangular rooms. This type of pueblo may be considered a stage in architectural development between the older type of structure and the mixed or modern form which shows a retrogression in the art of masonry.

Mr. J. N. B. Hewitt, while conducting studies in Canada relative to the Iroquois League, was selected as an official delegate from the council of the Six Nations to attend a condolence and installation ceremony at Muncietown, in which he took a leading part, requiring the intoning of an address of comforting in the Onondaga language and also in acting the part of the Seneca chiefs in such a council.

Among the special researches carried on during the year may be mentioned the completion of the manuscript on the ethnology of the Kwakiutl Indians by Dr. Franz Boas, honorary philologist. Work is nearly completed on the results of the field work on the Salishan language, carried on through the generosity of Mr. Homer E. Sargent, of Chicago, by Mr. James Teit. The study of Indian music has been continued by Miss Frances Densmore, sufficient data now being on hand to complete a work on the music of the Ute Indians, among whom Miss Densmore has now spent two field seasons.

The bureau has published during the year one annual report, two bulletins, and a list of publications of the bureau. In press or in preparation at the close of the year were four reports and eight bulletins. The library of the bureau accessioned 435 new books and 388 pamphlets.

INTERNATIONAL EXCHANGES.

The International Exchange Service, for the exchange of governmental and scientific publications with other countries, though very much hampered in its operations by war conditions, has nevertheless handled during the year a total of 268,625 packages, weighing 290,193 unds. On account of the very high ocean freight rates Congress lowed a small additional appropriation to meet the expense of reign shipments.

Suspension of shipments is still found to be necessary in the case about 10 countries. It is gratifying to note that since the begin-ng of the war only three shipments sent out by the Institution have en lost through hostile action, two of these being on vessels sunk by stile warships. Wherever possible duplicate copies of the publica-ns in lost consignments are procured and another shipment made.

It has been the custom of the Government of India to refer requests om establishments in this country for Indian official documents to e Exchange Service for indorsement, and this year a request for nilar services by the director of the Government press at Cairo, gypt, has been granted.

NATIONAL ZOOLOGICAL PARK.

The National Zoological Park is each year becoming more and ore recognized as a means of natural history education and as a ace of recreation and amusement for the public, and the collection animals is now one of the most varied and interesting of its kind the country.

In October, 1916, Dr. Frank Baker, superintendent of the park r 26 years, resigned to take effect November 1, and was succeeded Mr. Ned Hollister, assistant curator of the division of mammals the National Museum.

The total number of animals in the park at the close of the fiscal ar was 1,223, including 484 mammals, 683 birds, and 56 reptiles. nong important additions may be mentioned five adult Rocky ountain sheep received from the Canadian Government; four Bed-rd deer, or Manchurian stags, from the Duke of Bedford; and me desirable Australian marsupials presented by Mr. Victor J. ans, of Washington, D. C.

Visitors to the park during the year numbered 1,106,800, a daily erage of 3,032. One hundred and fifty-three schools and classes amined the collection for educational purposes.

Among recent improvements the superintendent notes that the spital and laboratory on which work has been in progress for the st two years, now lacks only the laboratory equipment for the use pathologists, and the outside yards for the animals to be con-ied in the hospital limits. The lake for North American water wl has been enlarged and reconstructed to show as many as pos-le of these birds in their natural surroundings. At present no s than 136 American water birds of 24 species are to be seen in e lake.

Every effort is being made to make the park a sanctuary for native wild birds. Over 100 nesting boxes have been put in place and during the cold weather food is provided, resulting in a notable increase in the bird population of the park.

As noted in last year's report, the appropriation made by Congress in 1913 for the acquisition of a frontage for the park on Connecticut Avenue, lapsed owing to delays caused by legal complications, and it is regretted that Congress has not made a new appropriation for this purpose. As the principal entrance to the park will probably be on Connecticut Avenue for all time, it is exceedingly important that the land in question be acquired before it is too late.

Among the imperative needs of the park, the superintendent mentions some provision for the parking of the increasing number of automobiles that visit the Zoo, outdoor dens for carnivorous animals, additional ponds for waterfowl, a bird house, and a reptile house. The most urgent need, however, is a substantial increase in the general appropriation. Owing to the steady advance in the cost of supplies and the increasing expense occasioned by the larger number of visitors, the point has now been reached where the entire appropriation, which has remained the same for the past seven years, does not cover actual maintenance expenses.

For some years past the National Zoological Park, in common with other similar institutions in the United States, has felt the effect of conditions that operated to hinder more and more the importation of wild animals from abroad and to reduce the supply.

At the suggestion of Dr. W. T. Hornaday, director of the New York Zoological Park, a conference was held at the Philadelphia Zoological Garden to consider the question of sending a joint expedition, on behalf of the New York, Philadelphia, and National Zoological Parks, to South Africa for animals. It was decided to send a man out to look the ground over, see what could be done in the way of arranging for a supply of animals for the future, and bring back anything desirable that could be secured at the time. Mr. J. Alden Loring, who had been successful in bringing animals from Europe for the New York Zoological Park, and had also had experience in Africa as a member of the Smithsonian expedition to East Africa, was selected to make the trip.

Mr. Loring sailed from New York July 22, 1916, taking with him hay and grain enough to feed as many antelopes and other herbivora as he was likely to obtain, for one of the conditions necessary to secure their entry into the United States was that no forage from Africa should be brought with the animals. He arrived at Port Elizabeth, South Africa, August 31, and, returning, sailed from Durban November 22.

The opportunities for securing animals to bring back were found be in some respects less favorable than had been anticipated, but rtunately the zoological garden at Pretoria was fairly well stocked, d the director was kind enough to deplete the collection somewhat r the benefit of his distant colleagues. Most of the animals which r. Loring brought back were obtained there, an interesting collecon of mammals and birds being secured. The mammals obtained clude a gemsbuck, a blessbuck, a white-tailed gnu, a nilgai, four ringbucks, a pair of duikers, a pair of meerkats, and a few moneys and rodents. Among the birds are two secretary vultures, a ateleur eagle, a hornbill, francolins of several species, a few uracous and hawks, and a number of smaller birds. The collection as been divided between the three institutions concerned, accordng to their choice, and in proportion to the share of the expenses hat was borne by each. Altogether there were secured 28 mammals, epresenting 13 species; 60 birds, of 25 species; and 55 snakes and ortoises, of 8 species.

While in South Africa, Mr. Loring visited and made notes on the ological gardens at Cape Town, Durban, Bloemfontein, Johannesurg, and Pretoria.

ASTROPHYSICAL OBSERVATORY.

Measurements of solar radiation were continued as usual on Mount Vilson. As stated in connection with the Hodgkins fund, an allotnent has been made to undertake similar work in South America. Much attention was devoted by Director Abbot to the preparation f the equipment of this expedition. Valuable new instruments vere devised and constructed under his direction. Owing to war onditions the expedition was located temporarily at Hump Mounain, N. C., in May, 1917, and shelters prepared and apparatus et up and adjusted under the care of Messrs. Abbot and Aldrich. The research on the absorption of terrestrial radiation by vapors f the atmosphere, upon which Mr. Fowle has been engaged for everal years, has been completed, and the results, which are of reat importance to meteorology, have been made ready for publication by the Institution. A paper of uncommon interest, by H. Helm Clayton, based upon observations by the Astrophysical Observatory, has been published in the Smithsonian Miscellaneous Collections. The author shows that the short-interval solar variations, iscovered in Mount Wilson work, affect terrestrial temperatures nd pressures the world over in a well-marked and predictable nanner. It is greatly to be hoped that daily solar-radiation observations at all times of the year may be obtained for use in such neteorological researches. It was for this purpose that the South

American expedition was planned, and it will be unfortunate, indeed, if war conditions should long delay the carrying out of this work.

POSSIBILITY OF FORECASTING FROM SOLAR OBSERVATIONS.

As Dr. Clayton has shown that variations of the sun are followed a day or two later by correlated variations of temperature, it is of interest to inquire if the fluctuations of temperature thus caused are large enough to be worth predicting. From Clayton's curves it seems to be shown that in 1913 and 1914 changes of solar radiation of 1 per cent produced changes of maximum temperatures as follows:

Pilar, Argentina.	+5.2° C.
Manila, Philippine Islands.	+1.5° C.
Winnipeg, Canada.	—6.3° C.

It may be supposed that the mean temperatures changed half as much, or +2.6°, +0.75°, and —3.15° corresponding to 1 per cent rise of solar radiation. Changes of 3 per cent or even 5 per cent in solar radiation within 10 days are not very uncommon. For instance, note the following values of "solar constant" observed on Mount Wilson in 1911:

Date, Sept.	3	4	5	6	7	8	9	10	11
Value	1.888	1.906	1.917	1.960	1.938	1.903	1.948	1.908	1.852

The observed range was 5.5 per cent in 8 days.

Obviously, the subject presents possibilities that when sufficient observing stations are equipped in various cloudless regions to yield accurate "solar constant" values every day, it may be possible to forecast for one or two days in advance a very considerable part of the now outstanding temperature fluctuations. At present the two stations of the Smithsonian Institution in California and North Carolina are the only ones making the required solar observations, and not in half of the days in the year, especially in midwinter and midsummer, can observations be made on account of cloudiness. A bequest of $500,000 would enable the Institution to equip and maintain indefinitely the required observing stations.

INTERNATIONAL CATALOGUE OF SCIENTIFIC LITERATURE.

As the greater part of the countries supporting regional bureaus of the International Catalogue of Scientific Literature are now actually engaged in hostilities, a great deal of difficulty has been encountered in preparing and financing the Catalogue. The number of scientific papers being published has greatly decreased and it has been found practically impossible to obtain the necessary scientific and clerical assistance for the preparation of the Catalogue. However, the Central Bureau at London has succeeded in issuing four

lumes, the twelfth annual issue of geology, and the thirteenth
nual issue of chemistry, anatomy, and botany. This brings the
al number of volumes published since the inception of the Cata-
gue in 1901, up to 216 volumes containing about three million
ferences to current scientific periodicals. The organization as a
ole is holding together very well under extremely adverse condi-
ns, and when peace is declared it will be necessary only to resume,
ther than reorganize the work.

It is becoming more and more difficult to draw the line between pure
ence and applied science, and the present limitation of the Catalogue
pure science should be broadened to include at least some of the
plied sciences which are advancing with such great strides. Al-
ough this would increase the size and cost of the Catalogue, yet
enhanced value would by increasing the demand for it and con-
quently its sale, offset any additional cost.

Respectfully submitted.

Charles D. Walcott, *Secretary.*

APPENDIX 1.

PORT ON THE UNITED STATES NATIONAL MUSEUM.

SIR: I have the honor to submit the following report on the op-
tions of the United States National Museum for the fiscal year
ling June 30, 1917:

INTRODUCTORY.

In the last report it was stated that Mr. Charles L. Freer had
de arrangements for the immediate erection of the building to
use the valuable collections of American and Oriental art which
has presented to the Nation through the Smithsonian Institution,
d also that the preliminary plans had been approved, the site se-
ted and the necessary funds, amounting to $1,000,000, transmitted
him to the Institution. It is exceedingly gratifying to announce
at the detailed plans having been sufficiently advanced by that time
e work of excavating was begun on October 2, 1916, and by the
se of the fiscal year the foundations, including the concrete walls
closing the subbasement, had been completed.

This addition to the Smithsonian group of buildings, with a front-
ge of 228 feet, a depth of 185 feet, and a height of 46 feet, and
ntaining an open central court about 65 feet square, will present
exterior of pink granite from quarries at Milford, Mass., a stone
hich has been employed with good effect for several prominent
ructures in Washington. Above the ground level it will consist
ly of a basement and main story, the former lighted by windows,
e latter almost wholly by skylights, leaving the upper part of the
lls essentially unpierced except for the entrances, of which that on
e north front comprises three large arched openings. The location,
the corner of Twelfth and B Streets S. W., between the buildings
the Smithsonian Institution and the Department of Agriculture,
ems to assure favorable surroundings for the future, as there is
ght probability of intrusion by any high or otherwise objectionable
nstructions in that vicinity.

Not only beautiful and effective in general design, but showing
interior plan a thorough adaptation to the requirements of the
llections both as to space and to lighting, with such facilities as
ll make it practically an independent unit of the Smithsonian
oup, the character of the construction work so far as it has been

carried leaves nothing to be desired in respect either to enduring quality or to interpretation of the architect's conception.

The subbasement will contain the appliances connected with the heating, lighting, and ventilation of the building, but steam and electric current will be supplied from the central plant of the Museum. In the basement, which will be a well-lighted story, will be located large studios and rooms for the storage of such parts of the collections as are not on exhibition, a capacious lecture hall, an office for the curator, and work and comfort rooms, furnishing, in fact, all necessary conveniences for administration, for serious study, and for popular instruction.

The main story will be entirely devoted to exhibition purposes and be divided into 19 rooms, each designed for a particular subject or class of objects, reached by wide corridors. The Whistler collection will occupy five of these rooms, in one of which the decorations of the famous Peacock Room will be installed. The central court, to contain a fountain, will be a special feature of this story, large arched openings lighting the adjoining corridors and loggias. The entire available floor space of the main and basement stories will aggregate some 55,000 square feet, about equally divided between the two floors.

It will be recalled that this building is designed to accommodate only the Freer collections and to provide for the study and appreciation of their varied contents which supply a vast amount of material for research work by specialists. As an integral part of this specific gift of art, the most important and valued donation which any individual has ever made, freely and unconditionally, to the Nation, it can not be otherwise employed. Its completion, an event anticipated for the fiscal year 1918-19, while insuring an incalculable gain for the Museum and the public, will not, therefore, satisfy any of the needs, set forth in the last report, in respect to additional space for the national collections of both the applied and the fine arts, as also of American history. The valuable materials in these departments, which have long since been seriously overcrowded, can at present be neither properly utilized nor appropriately brought to the attention of the public. In one branch especially, that of the industrial arts, it is unfortunate that such a condition should now exist, particularly as it is coupled with lack of means for securing an adequate staff of practical experts, as the collections are closely associated with many of the vital problems now confronting the country. With its limited facilities, however, an effort is being made to demonstrate the value of Museum work in time of crisis, and contributions made since the close of the year but in time to mention the fact of their publication here, have been recognized as of great national importance by those high in authority.

COLLECTIONS.

The additions to the collections, received in 1,450 accessions, aggregated approximately 195,845 specimens and articles, classified by subjects as follows: Anthropology, 10,775; zoology, 71,761; botany, 79,155; geology and mineralogy, 9,800; paleontology, 23,190; textiles and woods, 933; mineral technology, 213; and National Gallery of Art. 18. Many loans were also accepted for exhibition, chiefly in the Gallery of Art and the division of American history; and 906 lots of material, consisting mainly of rocks, ores, minerals, and zoological specimens were received from various parts of the country for examination and report.

Anthropology.—A varied collection from the island of Celebes, made by Mr. H. C. Raven and presented by Dr. W. L. Abbott, and a large number of objects exhibiting every phase of the textile art as practiced among the Indians of British Guiana, assembled by Dr. Walter Roth, constituted the most important accessions in ethnology. Pertaining to aborigines of the North American Continent were rare Papago Indian baskets, baskets of interesting weaves and designs, carved and painted house posts, etc., from the Quileute Indians of Washington; articles of ivory, horn, wood, bark, and stone from Eskimo and British Columbian tribes; and many objects pertaining to the Pueblo Indians of Arizona and New Mexico. Other acquisitions were from Mexico, Central America, Abyssinia, Japan, China, and the Philippines.

Especially noteworthy was a large collection of antiquities made by Capts. John W. Wright and Alexander T. Cooper, United States Army, while with Gen. Pershing's expedition in the State of Chihuahua, Mexico, comprising nearly every variety of artifact of stone belonging to the ancient mound builders of that region.

Explorations under the Smithsonian Institution resulted in extensive archeological collections from the Mesa Verde National Park, Colo., and from old Zuñi ruins near Gallup, N. Mex., made by Dr. J. Walter Fewkes; from ancient pit villages in New Mexico and ruins at Awatobi, Ariz., made by Dr. Walter Hough; from sites of prehistoric adobe dwellings in western Utah, made by Mr. Neil M. Judd; and from a cave in the southern wall of Cibollita Valley, N. Mex., made by Mr. F. W. Hodge. Dr. W. L. Abbott presented much valuable archeological material obtained during his investigations in Santo Domingo, and among the smaller accessions were many rare specimens from North and Central America.

Hadji Ephraim and Mr. Mordecai Benguiat made important additions to the rich collection of antique Jewish objects lent by them during previous years. Included in a valuable gift from the estate of the late John Chandler Bancroft Davis were necklaces, scarabs, figurines, and Ptolemaic coins from Egypt, a sculptured brick from the Colosseum at Rome, and marble and terra-cotta vases. From Miss Isobel H. Lenman were received as a loan a collection of ancient glassware, comprising bottles, flasks, bowls, cups, tear bottles, bracelets, beads, and other articles, displaying the marvelous iridescence characteristic of the ancient glassware of Syria and Phoenicia.

The principal accession in physical anthropology consisted of material obtained in Peru by Dr. Aleš Hrdlička in 1915 in connection with the assembling of exhibits for the Panama-California Exposition. It includes hundreds of objects of great value, among which are many specimens representing rare and in some instances unique anatomical features. Besides an excellent series of brains of gorillas and chimpanzees from the Cameroons and casts of the Sivapithecus remains from India, aboriginal skulls and other bones were received from the vicinity of Vero and Fort Myers, Fla., representing the supposedly very ancient man of that region, from ancient mounds in Utah and the Mesa Verde ruins in Colorado, from Tennessee and Illinois, and from Colombia and Hawaii.

Among the many acquisitions in the division of mechanical technology were rare watch movements; early pieces of apparatus relating to the invention and history of the telegraph, the telephone. the telautograph, the phonograph, and the graphophone; a Howe sewing machine, which sewed the first seam done by machinery; and numerous interesting firearms, some of early make.

To his previous munificent donation, illustrating the history and development of the pianoforte and including dulcimers, spinets, clavichords, harpsichords, and organs, Mr. Hugo Worch added 28 pieces, increasing the extent of this remarkable collection to 117 instruments.

An instructive addition to the exhibition series in graphic arts was a life-size figure of a Japanese wood-cut printer at work, the outfit, complete in every detail, having been a gift from the Imperial Government of Japan. A much earlier stage in the development of graphic methods is illustrated by an original Mexican painting, executed on a sheet of palmetto fiber smoothly surfaced with white clay. Among other interesting acquisitions were one of the earliest forms of the machine for casting linotype slugs; materials of the various kinds employed in miniature painting, with examples of miniature work on ivory, parchment, and porcelain; and a series of specimens illustrating processes in making line-cut and halftone engraving.

American history.—The most notable memorial accession consisted of a large number of relics of Admiral David G. Farragut, United States Navy, including a jeweled sword presented by the Union

ague Club of New York and a portrait of Farragut by William
vain, which were received as a donation from the estate of the late
yall Farragut, only son of the Admiral. Other officers of the
ıvy represented by contributions were Commodore Stephen De-
tur, Commodore John Rodgers, and Rear Admiral C. M. Chester.
nong the furniture secured for the collection were pieces which had
longed to Presidents Washington and Jefferson, President and Mrs.
adison, and Charles Cotesworth Pinckney, American minister to
ance in 1796–1798. To the large series of medals awarded Com-
ınder Matthew Fontaine Maury in recognition of his services to
ience, and placed in the Museum by several of his descendants,
ıs added the ribbon of the Grand Cross of the Order of Our Lady
Guadaloupe, presented by Emperor Maximilian of Mexico in 1866,
gift from Mrs. Mary Maury Werth.

For the gift of the wedding dress of Harriet Lane Johnston, niece
President Buchanan, for several years shown in the section of
storical costumes, the Museum was indebted to Miss May S. Ken-
dy. Other hostesses of the White House represented by costumes
ore or less complete, lent during the year for incorporation in the
ntral feature of the hall, were Mrs. Martha Jefferson Randolph,
aughter of President Jefferson; Mrs. Martha Johnson Patterson,
aughter of President Johnson; and Mrs. Theodore Roosevelt.
mong interesting relics were a silk dressing gown of Lafayette, an
iderdown quilt used by Jefferson, a beaded bag of Mrs. James Mon-
oe, and a handkerchief that had belonged to Queen Anne.

A large number of decorations, medals, and badges of the United
tates and foreign countries, which had been assembled by the late
ieut. Thomas Kelly Boggs and were presented by Mrs. Boggs,
ormed a very gratifying addition to the numismatic collection. The
reater part of these tokens are foreign war decorations of very
mely interest, and 23 countries are represented. The philatelic col-
ction was augmented to the extent of 3,398 specimens, mainly re-
ived through the Post Office Department, and including 1,893 ex-
nples of new issues of stamps from countries in the Universal Postal
nion.

Biology.—Through the generosity of friends the department of
ology was greatly enriched by the results of field work in different
ırts of the world, adding new genera and species and many forms
t previously represented in the Museum. Mr. H. C. Raven, under
further grant of funds by Dr. W. L. Abbott, continued his collect-
ıg on the island of Celebes, sending to Washington about 900 mam-
al skins, besides over 1,000 specimens each of birds and mollusks.
r. Abbott personally spent some time in Haiti, where he obtained
ıany birds, including species whose occurrence on that island was
nexpected, reptiles, and mollusks, and also a large quantity of bones

of mammals from prehistoric kitchenmiddens. The study of similar deposits on this and other islands of the Antilles was an interesting feature of the year's activities, a large collection of bones gathered by Mr. Theodoor de Booy in Cuba, Santo Domingo, and the Virgin Islands, and presented by Mr. George G. Heye, having yielded new genera of rodents, birds, and reptiles, which have apparently become extinct within comparatively recent times.

As the proceeds of an expedition to Cuba and Haiti by Mr. John B. Henderson, accompanied by Dr. Paul Bartsch, the Museum received from Mr. Henderson numerous birds, reptiles, and fishes, and over 15,000 land and marine invertebrates, mostly mollusks. Mr. F. J. Dyer, American consul at Ceiba, Honduras, contributed a large number of insects and mollusks from that country; and Mr. Arthur de C. Sowerby transmitted mammals, birds, crustaceans, and mollusks from northern China and Manchuria.

The Bureau of Fisheries deposited, as usual, valuable collections of fishes and marine invertebrates, besides many interesting specimens of mammals, birds, and reptiles. Among the fishes were 72 types, cotypes, and paratypes, 40 of which were of species obtained on the Philippine cruise of the steamer *Albatross* in 1907–1911. The marine invertebrates, numbering several thousand specimens, included recently described type collections of annelids and parasitic copepods. Transfers, chiefly of mollusks and crustaceans, aggregating over 400 specimens, were made by the Biological Survey and Bureaus of Entomology and Plant Industry of the Department of Agriculture.

Exceptionally noteworthy was a bequest to the Museum by the late Julius Hurter, sr., of St. Louis. An enthusiastic collector, he had gathered one of the largest and finest private collections of reptiles and batrachians in existence. Its principal scientific value lies in its splendid series of Missouri forms which served as the basis for Mr. Hurter's "Herpetology of Missouri," published in 1911. Not solely confined to that region, however, it contains valuable material from various parts of the world, and most of the important subdivisions of the group are represented.

From the Santa Marta Mountains in Colombia were received 149 specimens of birds, which added 6 species new to the Museum, and from Panama, 213 specimens of reptiles and batrachians, the latter collected by the Smithsonian biological survey of the Canal Zone. Mr. James Zetek transmitted 769 specimens of mollusks and other marine invertebrates from Panama, and Prof. G. S. Dodds, of the University of Missouri, presented a large number of Entomostraca, representing 55 species, collected in 124 lakes and ponds in Colorado and forming the basis of a paper which he had published.

The Bureau of Entomology was the principal contributor of insects, transferring about 3,000 specimens of various orders. The material from American Consul Dyer in Honduras has already been mentioned. The other more important accessions comprised Lepidoptera from Peru, Mexico, and Alaska; Hymenoptera from western Argentina, and a collection of miscellaneous insects from Mount Kinabalu, British North Borneo.

The additions to the botanical collections exceeded 79,000 specimens, including about 25,000 specimens from the Vanderbilt Herbarium at Biltmore, N. C., comprising all that were saved from the disastrous flood of July 15, 16, 1916. This valuable herbarium, which was established and maintained for many years by the late George W. Vanderbilt, contained at the time of the flood upward of 100,000 specimens, and was especially noteworthy for its representation of the plants of the southeastern United States. This accession, which was accompanied by the remnant of the botanical library attached to the herbarium, was a gift from Mrs. Vanderbilt.

Another notable accession consisted of about 15,000 specimens of cryptogams, mainly mosses, hepatics, fungi, and myxomycetes, from the northeastern United States and Liberia, presented by Prof. O. F. Cook. The Department of Agriculture deposited over 5,800 specimens, resulting principally from field work of the Bureau of Plant Industry and including many tropical American palms and Alaskan and Hawaiian plants. Through exchanges, important collections were obtained from the New York Botanical Garden, the Gray Herbarium of Harvard University, the Missouri Botanical Garden, the British Museum, and the Bureau of Science at Manila. A gift of about 1,000 Venezuelan plants was received from the Carnegie Institution of Washington, and about 5,000 specimens were collected in New Mexico for the Museum by Mr. Paul C. Standley, assistant curator.

Geology.—The Charles U. Shepard collection of meteorites, the bequest of which was announced in the last report, was formally transferred to the Museum during the year, and constitutes one of the most important accessions ever acquired by the department of geology. It comprises 238 falls and finds. Additional specimens of meteorites to the number of 26 were obtained by gift and exchange, and there were many acquisitions of valuable ores and rocks from various localities.

The more prominent accessions of minerals, as also of petrological material, were from the Geological Survey. Among the former, were a fine large series illustrating the occurrence of turquoise, a number of amethyst crystals, many semiprecious stones, and a large number of minerals and rocks collected in connection with studies of the gem deposits of southern California. Among the latter were extensive collections of rocks and ores representing geological researches in several districts in the western United States.

From other sources were obtained many rare as well as some instructive series of minerals and a number of showy specimens especially desired for exhibition. Among these were type specimens of stevensite and creedite, material illustrating the genesis of the zeolites and their association with glauberite cavities, a remarkable specimen of glendonite from Australia, an exceptionally large crystal of iron pyrite and a fine specimen of crystallized anglesite.

The principal acquisitions in invertebrate paleontology were a collection of Silurian fossils, transferred by the Geological Survey, which had formed the basis of papers illustrating the geology and paleontology of Maine, the types of nine species of Paleozoic crinoids, a series of rare and recently described insects from the Tertiary rocks of Colorado, several hundred species of European invertebrates, and about 2,000 specimens of Lower Ordovician fossils from the zinc mines of Arkansas.

A collection of Permian vertebrates from Baylor County, Tex., contains the greater part of a skeleton of the large finbacked reptile *Dimetrodon*, complete enough to mount for exhibition, besides remains in less perfect condition of the same form and of *Cardiocephalus*, *Lyosorophus*, *Diplocaulus*, *Seymouria*, and *Labidosaurus*, and many bones of small reptiles and batrachians. The skull and lower jaw of a fossil horse, the type of a recently described species, from the Pleistocene gravels of the Yukon Territory, and part of the skull of a fossil muskox from the Pleistocene of Miami County, Ind., were also obtained.

About 400 specimens of small mammalian remains of rare forms from cave deposits in the mountains of western Cuba were collected for the Museum by Mr. William Palmer, and a large part of the skeleton of an extinct and probably undescribed species of bird was received from the Geological Survey. Goucher College, of Baltimore, deposited a collection of reptiles and cetacean remains from the Arundel formation of Maryland, bringing together in the National Museum practically all of the known vertebrate material from that formation in Maryland.

Secretary Walcott and party spent the summer and early fall on the Continental Divide between Alberta and British Columbia, south of the Canadian Pacific Railway, and besides extensive geological observations collected about 1,000 pounds of Cambrian material containing fossils, which were shipped to Washington.

Textiles.—The accessions in the division of textiles comprised many excellent examples of the present-day productions of American textile industries. The largest group of specimens received consisted of the most important types of cotton threads, arranged to show the various ways in which they are wound and put up for family and factory use. They were accompanied by several beautiful examples of tatting, crochet, embroidery, and cut work, in white and colors, suggesting artistic and practical uses for many of the threads in the series, and supplemented an extensive series of models and machine parts illustrating the manufacture of cotton thread previously received from the same contributor.

The hearty cooperation of many American manufacturers has continued to keep the collections supplied with new types and designs of dress goods as soon as these novelties appear on the market. The exhibits illustrating the principal methods used in decorating fabrics were enriched by numerous examples of tied and dyed work and many samples of skein-dyed plaid silks for comparison with piece-dyed and printed fabrics.

Fresh samples of the standard types of ribbons commonly used and many beautiful specimens of novelty and fancy ribbons, showing Aztec, Indian, Chinese, and Byzantine designs, augmented the ribbon section. The adaptability of mohair, by reason of its luster and resiliency, to the manufacture of plushes, velvets, and fur fabrics was shown in an instructive series of specimens comprising upholstery goods, cloakings, trimmings, and automobile rugs. Examples of household industry in the textile arts of a former period were received in the form of hand-woven coverlets and quilts, while valuable specimens of foreign hand-worked textiles from China, Spain, and Germany were added to the collection through friends of the Museum.

Additions were obtained for the collection of implements illustrating the preparation and use of flax and other fibers in former times, including an old wooden rope machine which had seen many years' service in twisting bed cords and wash lines. The utilization of pine needles in the manufacture of coiled baskets and of split-palm stems for large pack baskets was shown in other accessions.

Wood technology.—Although circumstances greatly retarded the progress of work in wood technology, some interesting exhibits were secured. A model measuring 12 by 15 feet and contributed by the Forest Service is designed to show the various important uses of the national forests and their administration. A comprehensive cork exhibit covers every phase of the industry from the raw bark to the many articles made from this substance, and certain modern methods of preserving wood are represented by a model and samples of the materials employed. Examples of 15 species of Argentine woods and 49 specimens of woods from Surinam were added to the commercial series of timbers, and the series illustrating wood finishing and tanning materials were also increased.

Mineral technology.—Most important among the additions in mineral technology was an impressive model of the Bingham Canyon copper property in Utah, measuring 16 by 19 feet, accurately sculptured and colored, representing what is probably the most significant mining achievement of the present generation. It was a gift from the Utah Copper Co. The manufacture of white lead is shown in another excellent model presented by the National Lead Co., of New York, while among the models made in the Museum are five visualizing the mode of occurrence, the recovery, and the preparation, respectively, of tin, sulphur, asphalt, lime, and oil. A specimen exhibit illustrative of design and execution in cut glassware, specially prepared for the Museum, was contributed by T. G. Hawkes & Co., of Corning, N. Y., and another series of specimens exemplifying the properties and uses of asphalt came from the Barber Asphalt Paving Co.

Exhibits more or less representative or at least covering some phase of 18 mineral resource types are now available to the public in the halls of the division. Of these, abrasives, asbestos, asphalt, coal and coal products, copper, graphite, lime, mica, petroleum, plaster, Portland cement, and sulphur have been treated with sufficient fullness to warrant the publication of descriptive accounts of them and of their significance.

NATIONAL GALLERY OF ART.

The progress of work in the erection of the building for the Freer collections has already been mentioned. Next in importance to record in this connection are the terms of the will of Henry W. Ranger, N. A., one of the best-known of contemporary American painters, who died on November 7, 1916, leaving his residuary estate, estimated at over $200,000, to the National Academy of Design to be held as a permanent fund of which the income is to be used for purchasing paintings by American artists, the paintings so obtained to be given to art or other institutions in America which maintain a gallery open to the public, upon the express condition that the National Gallery of Art shall have the option and right to take, reclaim, and own any picture for its collection provided such option and right is exercised at any time during the five-year period beginning 10 years after the artist's death and ending 15 years after his death.

This generous provision by Mr. Ranger, which has been most gratifying to all lovers of art in this country and may be expected to have a stimulating influence upon the work of American artists, will result in a much wider circulation than hitherto of good American paintings and insure the gradual assembling for perpetual exhibition at Washington of some of the best that our painters can produce. The system of selection will, in its working, be not unlike that which has been followed by the French Government in Paris, and it is to be hoped that the fund for so worthy a purpose may in time be greatly increased through corresponding action by other public benefactors. The National Gallery contains five of Mr. Ranger's paintings, all of which were presented by Mr. William T. Evans.

Among the permanent acquisitions by the Gallery during the year were the following oil paintings: "June," by John W. Alexander; "On the Lagoon, Venice," by R. Swain Gifford; "Portrait of Benjamin West," by himself; "Portrait of J. J. Shannon, R. A.," by Orlando Rouland; "The Song of the Sea," by William F. Halsall; "Portrait of Ellwood Hendrick," by Augustus Vincent Tack; "Evening," by William J. Kaula; "Landscape," by Chauncey F. Ryder; "A Breton Sunday," by Eugene Vail; "The Happy Mother," by Max Bohm; "Portrait of Maj. Gen. Julius Stahel, U. S. Volunteers." by J. Mortimer Lichtenauer; and "Portrait of Joseph Henry," first Secretary of the Smithsonian Institution, by Henry Ulke. Among the sculptures were a bronze "Statue of Robert Emmet," by Jerome Connor; a bronze figure, "The Fire Dance," by Louis Potter; and a marble statue "The Dying Tecumseh," by Chevalier Ferdinand Pettrich.

An oil portrait of Dr. Charles D. Walcott, recently painted by Ossip Perelma, was deposited by the Smithsonian Institution, as were also large oil portraits of Washington, Jackson, Henry Clay, and W. W. Corcoran, by the Supreme Court of the District of Columbia.

Through the kindness of Mr. Ralph Cross Johnson, many fine examples from his splendid private collection of paintings were continued on exhibition throughout the year, while the collection of Mr. W. A. Slater remained in the Gallery until in December. Seventeen paintings from 11 friends of the Gallery were also added to the general loan collection.

The Gallery held four special loan exhibitions during the year. The most notable of these, given under the auspices of the National Park Service of the Department of the Interior during January and February, and designed to bring to the attention of American tourists some of the marvelous natural attractions of their own country, consisted of 45 oil paintings illustrating scenes mainly in the National Parks and Monuments of the United States, among the 27 artists represented being Albert Bierstadt and Thomas Moran. Assembled in connection with the meeting of the National Parks Conference held in the Museum auditorium from January 2 to 6, this interesting exhibition was opened with a special view on the evening of the second and the majority of the paintings remained on display until March. It was supplemented by series of photographs, studies in oil, and other pictorial matter shown in several rooms.

The other special exhibitions were as follows: Twenty oil paintings and 1 bronze group, by Edwin Willard Deming, illustrating the old-time Indian, his war, hunting, and religious life and mythology; a collection of 27 oil portraits and other paintings by Orlando Rouland, which was opened on the evening of April 2, and was especially noteworthy for the number of prominent men represented; and a collection of 48 paintings, mostly portraits, by the Russian painter, Ossip Perelma, which began on April 28.

Mention should also be made of the ceremonies attending the presentation to the Gallery by the Emmet Statue Committee of the bronze full-length figure of Robert Emmet by Jerome Connor, which took place in the rotunda of the new building on the afternoon of June 28. A distinguished audience, including the President of the United States and other high officials of the Government, was in attendance and several addresses were made.

MEETINGS AND CONGRESSES.

The accommodations afforded by the auditorium and committee rooms in the natural history building were utilized on many occasions. Three courses of lectures, extending from November to April, were given under the auspices of the Washington Society of the Fine Arts, while three other local societies, the Anthropological Society of Washington, the District of Columbia Dental Society, and the Society of Federal Photographers, also made this building their regular meeting place.

The National Academy of Sciences had its annual meeting in April, and lectures were delivered under the auspices of the Washington Academy of Sciences, the War College, the Audubon Society of the District of Columbia, the Bureau of Commercial Economics, the Washington Center of the Drama League of America, the Shakespeare Society of Washington, and George Washington University.

Several bureaus of the Department of Agriculture made use of the auditorium or committee rooms for conferences and hearings, and meetings were held by four societies representing special fields of agricultural subjects. The exhibition halls in the natural history building were opened one evening for the benefit of the Ohio Corn Boys and Domestic Science Girls, then visiting Washington. Other meetings of a governmental character were as follows: By the National Association of Postmasters, holding its nineteenth annual convention; by the Bureau of Foreign and Domestic Commerce of the Department of Commerce; by the National Parks Conference, under the auspices of the National Park Service of the Department of the Interior, accompanied by an exhibition of paintings; by the National Research Council; and by the Bureau of Commercial Economics, which gave an exhibition of lantern slides and motion pictures relative to the prevention of contagious diseases, for the benefit of the Council of National Defense. Mr. Eugene E. Thompson addressed the employees of the Institution and its branches on the subject of the first Liberty Loan, and two rehearsals of the Inter-Departmental Chorus in preparation for Flag Day exercises were held in the auditorium.

Receptions were given, on the invitation of the Regents and Secretary of the Institution, on the occasion of a special view of paintings by Mr. Orlando Rouland, and to the Daughters of the American Revolution at the time of their annual congress and the delegates to the eighth annual convention of the American Federation of Arts. The exhibition halls in the natural history building were opened on the evening of June 6 in honor of the visiting Confederate Veterans, Sons of Confederate Veterans, and Daughters of the Confederacy, the receiving party consisting of Secretary and Mrs. Walcott, Miss Mary Lee, and members of the local reception committee.

MISCELLANEOUS.

Over 6,000 duplicate specimens, included in 16 regular sets of mollusks, 19 regular sets of fossils, and a number of special sets, were distributed to schools and colleges. Exchanges for securing additions to the collections involved the use of about 19,500 duplicates, while above 14,000 specimens, chiefly biological and geological, were lent to specialists for study.

The attendance of visitors at the natural history building aggregated 343,183 persons for week days and 63,842 persons for Sundays, being a daily average of 1,096 for the former and 1,227 for the latter. At the arts and industries building and the Smithsonian building, which are open only on week days, the totals were, respectively, 161,700 and 86,336, and the daily averages, 516 and 275.

By the terms of three wills admitted to probate during the year the Museum will be materially benefited, and in another case the testator's desires have already been carried out. Attention has been called to two of these bequests in other connections. That of Henry Ward Ranger is destined to have an important bearing on the future welfare of the National Gallery of Art, while the collection of reptiles left by Julius Hurter, sr., is especially noteworthy and valuable. To the late Miss Sarah J. Farmer, of Eliot, Me., the Museum is indebted for the bequest of the models and apparatus left by her father, Moses G. Farmer, a prominent pioneer in the development of the electrical industries, many of whose inventions have for some time been represented in the Museum. Through the wishes of the late Rev. Bruce Hughes, of Lebanon, Pa., the Smithsonian Institution becomes the recipient of a small sum, the residue of his estate. to found the Hughes Alcove, which will be established in some form in the Museum and be added to perpetually from the interest on principal.

The publications of the year consisted of one volume of Proceedings, two volumes of Contributions from the United States National Herbarium, and four Bulletins, besides 76 separate papers, all of which were from the Proceedings, except two from the Contributions and two catalogues of special loan exhibitions in the National Gallery of Art. The total number of copies of publications distributed was about 64,000.

The library obtained, by purchase, gift, and exchange, 1,572 volumes, 65 parts of volumes, and 3,556 pamphlets. The more important donations were from Capt. John Donnell Smith, the estate of the late Dr. E. A. Mearns, United States Army, and Dr. William H. Dall.

Respectfully submitted.

RICHARD RATHBUN,
Assistant Secretary in Charge,
United States National Museum.

Dr. CHARLES D. WALCOTT,
Secretary of the Smithsonian Institution.
NOVEMBER 10, 1917.

APPENDIX 2.

ORT ON THE BUREAU OF AMERICAN ENTHNOLOGY.

R: Pursuant to your request dated July 3, I have the honor to
it the following report of the operations of the Bureau of
rican Ethnology during the fiscal year ending June 30, 1917,
ucted in accordance with the act of Congress approved July 1,
, making provisions for the sundry civil expenses of the Govern-
, and with a plan of operations submitted by the ethnologist-in-
ge and approved by the Secretary of the Smithsonian Institu-
The act referred to contains the following item:

> ierican ethnology: For continuing ethnological researches among the
> ican Indians and the natives of Hawaii, including the excavation and
> rvation of archæologic remains, under the direction of the Smithsonian
> tution, including necessary employees and the purchase of necessary books
> eriodicals, $42,000.

addition to conducting the administrative affairs of the bureau,
F. W. Hodge, ethnologist-in-charge, assisted by Miss Florence
oast, continued the preparation of the annotated bibliography of
Pueblo Indians as opportunity offered, adding about 1,000 cards
e 3,800 previously prepared.

SYSTEMATIC RESEARCHES.

April Mr. Hodge proceeded to New Mexico for the purpose of
ing final arrangements with the Zuñi Indians for the excava-
of the ruins of the large pueblo of Hawikuh, situated on their
rvation in the western-central part of the State. This having
accomplished, Mr. Hodge returned to Washington and in the
r part of May again proceeded to Zuñi and established camp at
ikuh, where excavations were immediately commenced under the
t auspices of the Bureau of American Ethnology and the Museum
he American Indian, Heye Foundation, of New York City, the
r institution bearing most of the expense of the expedition, and
gning Mr. Alanson Skinner and Mr. E. F. Coffin to aid in the
k. Authority for conducting the excavations was courteously
ted by the Secretary of the Interior.

The excavation of Hawikuh has as its chief object the study of a Zuñi pueblo known to have been inhabited from prehistoric times well into the historic period, for the purpose of determining, so far as possible, the character and arts of the Zuñi people in early times, as well as the effect of Spanish contact during the sixteenth and seventeenth centuries. Hawikuh was one of the famed "Seven Cities of Cibola" of early Spanish narrative, and its history from the time of its discovery in 1539 until its abandonment in 1670 is quite well known. Consequently the information that the ruins may be expected to yield will in all probability shed considerable light on a phase of the culture of a branch of the Pueblo Indians at an important period in their life.

It is not necessary in this brief report to present the results of the Hawikuh excavations, which were successful beyond anticipation in both a subjective and an objective way. It is expected that a summary report on the work, which was still in progress at the close of the fiscal year, will be presented for publication in the near future.

The beginning of the fiscal year found Dr. J. Walter Fewkes, ethnologist, engaged in an archeological reconnoissance in the vicinity of Gallup, N. Mex. Early in July he proceeded to Mancos, Colo., examining ancient ruins en route and commencing intensive archeological work in the Mesa Verde National Park, where he remained until the close of September. These excavations, conducted with the coöperation of the Department of the Interior, were in continuation of the work initiated several years ago, of uncovering and repairing the remains of the more important prehistoric ruins in that great area, thus making them available for study and adding to the park's many attractions.

The scene of Dr. Fewkes's activities during this season was one of a cluster of 16 ruins known as the Mummy Lake group, situated above Soda Canyon. None of the walls of this large ruin projected above the surface of the mound of fallen building stones and other débris covered with sagebrush, but on excavation tee remains were shown to be those of a rectangular pueblo, 100 by 113 feet, with three stories at the north and an annexed court inclosed by a low wall on the south. By reason of its commanding situation, Dr. Fewkes has named this former pueblo Far View House. After clearing the ruin of the great quantity of débris accumulated during centuries, the tops of the walls of the four kivas uncovered were protected with a capping of concrete, and so far as means would permit the walls of other chambers were similarly treated. As a report on Dr. Fewkes's work at Far View House will appear shortly,[1] it is not necessary to present the details here; but it may be mentioned that the most important result

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[1] "A Mesa Verde Pueblo and its People," Smithsonian Report for 1916, pp. 461-488, pl. 1-15, figs. 1-7, Washington, 1917.

f the study of this site is the fact that a new type of Mesa Verde
ructure has been revealed, the form and character of which shed
ght on the close relation of pueblos and cliff dwellings. Indeed,
r. Fewkes reports that Far View House is the only known example
f a pure type of pueblo ever completely excavated, the term "pure
pe" signifying a terraced community building constructed of
aped stones ant having circular kivas united with surrounding
ctangular rooms. Other significant features are the vaulted roofs
f the kivas, the supporting beams of which rest on pilasters, and
e presence of a ventilator and a deflector in each kiva, as in the case
f certain cliff dwellings. As this pure type of pueblo is entirely
rehistoric, it may be regarded as representing a stage in architec-
ral development between the older stage of pueblo structures and
e mixed type or more modern form in which the arrangement of
e rooms and the art of the mason exhibits a retrogression.

On finishing his work at Far View House, Dr. Fewkes visited
tah primarily for the purpose of determining the geographic dis-
ibution of ruins in the northern limits of Pueblo culture. This
connoissance extended to the Uintah Reservation, where hitherto
nknown ruins in Hill Canyon, near Ouray, were examined and where
number of stone towers similar to those along San Juan River
ere found. These ruins, to which Dr. Fewkes's attention was
lled by Mr. Kneale, agent for the Uncompahgre Ute, are espe-
ially striking owing to their unusual situation on eroded rocks of
ushroom shape. These towers mark the northernmost limit of
ueblo culture in eastern Utah, and some of them are especially in-
ructive by reason of their relation to prehistoric towers much
arther south. An illustrated report on these remains, by Dr.
ewkes, has already appeared.[1]

Mr. James Mooney, ethnologist, was engaged in field work among
e Eastern Cherokee of western North Carolina at the opening of
e fiscal year, and on his return to Washington, August 10, resumed
e translation and annotation of the Sacred Formulas of the Chero-
ee, as well as the identification of the plants, etc., used by the tribe
its medicine and other rites. Mr. Mooney reports this work to
well advanced, but its complicated nature, coupled with the
thor's ill health during the year, has made progress somewhat
ow. Mr. Mooney also spent considerable time in supplying in-
rmation on technical subjects for official correspondence.

Dr. John R. Swanton, ethnologist, was occupied chiefly with two
nes of investigation—the one historical, the other philological. In
uly and August he made a thorough examination of the Woodbury
owery and Brooks collections of manuscripts in the Library of Con-

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[1] "Archeological Investigations in New Mexico, Colorado, and Utah," Smithsonian Misc.
ll., vol. 68, no. 1, pp. 1–88, May, 1917.

gress bearing on the early Spanish history of Florida, finding many important items for incorporation in his "History of the Southeastern Tribes." In September Dr. Swanton visited the Newberry Library in Chicago, where other valuable early documents were found in the Edward E. Ayer collection, which subsequently were copied for the bureau's use by the courtesy of the librarian. These latter manuscripts include a report on the Indians of Louisiana by Bienville, a Louisiana memoir with an extended description of the Choctaw, and a memoir by the French captain Berenger, containing, besides historical and ethnological information, vocabularies of the extinct Karankawa and Akokisa tribes. A Spanish census of the Indians of Florida after the period of the English invasions should also be mentioned. For some months after his return Dr. Swanton was engaged in adding to his monograph the historical notes thus obtained, and in copying and translating the more important parts of the manuscripts mentioned, including all of the Berenger memoir.

Although Dr. Swanton's History of the Southeastern Tribes had been completed a year ago, so far as the information was then available, the manuscript discoveries described have enabled him to augment and to improve it substantially, and more recently he has obtained some supplementary notes from the Louisiana Historical Society. The preparation of the maps to accompany the monograph, chiefly from early sources, did not progress as satisfactorily as was hoped, owing largely to pressure of other illustration work, but they are now practically finished.

Dr. Swanton's second paper, also referred to in last year's report, remains as then practically complete so far as the available material is concerned, but it awaits further data respecting the social organization of the Chickasaw and the Choctaw. A third paper, on the religious beliefs and medical practices of the Creeks and their congeners, has been brought to the same stage as the last, namely, with all the available material incorporated and arranged, and the footnotes added.

With a view of furnishing the basis of a general study of the social organization of the tribes north of Mexico, Dr. Swanton spent a few weeks collecting material bearing on Indian economic life, but this has been laid aside temporarily on account of the greater urgency of a closer comparative study of the Indian languages of the southeastern part of the United States, particularly as indications of relationship between some of them have already been noted. As a basis for this work Dr. Swanton has recorded a comparative vocabulary of Creek, Choctaw, Alabama, Hitchiti, Natchez, Tunica, Chitimacha, Atakapa, Tonkawa, Comecrudo, Cotoname, Coahuilteco, and Karankawa. Of these languages about 500 words were chosen, but as the lexical material from several of the tribes is scanty, the comparison can never be complete. It was the intention to follow the compilation of this table with a closer comparison of Chitimacha and Atakapa, which show many resemblances, but in the course of the work so many more similarities between Chitimacha and Tunica presented themselves that these were selected instead. In partial furtherance of this research Dr. Swanton proceeded to Louisiana in May, where he remained almost until the close of the fiscal year, visiting, studying, and photographing the mixed Indian population along the gulf coast in La Fourche and Terra Bonne Parishes, the Chitimacha at Charenton, and the Koasati northeast of Kinder. From the Koasati about 150 pages of native text with interlinear translation were recorded, and 134 pages previously procured from an Alabama Indian in Texas were corrected.

Mr. J. N. B. Hewitt, ethnologist, at the beginning of March went to Canada for the purpose of continuing his Iroquois studies. Establishing headquarters at Brantford, Ontario, he at once undertook the work of revising the extended texts relating to the Iroquois League, recorded during former field trips. Shortly thereafter this work was interrupted when Mr. Hewitt was selected as an official delegate from the Council of the Six Nations to attend a condolence and installation ceremony at Muncietown, in which he took a leading part, requiring the intoning of an address of comforting in the Onondaga language and also in acting the part of the Seneca chiefs in such a council. This official recognition gave Mr. Hewitt the rare opportunity of observing how such a ceremony is conducted from an esoteric point of view.

On returning to Brantford, March 16, Mr. Hewitt resumed work on the texts pertaining to the league, which necessitated the reading of the words and the immediate context several times to determine their final form. Moreover, it was desirable to read the texts over with every informant separately in order to obtain a full expression of the informant's knowledge or criticism of the work of another. In this manner it was possible to study about 70 per cent of the texts, and this led, naturally, to the collection of other corrective or amplifying texts and notes. These aggregate 502 pages, comprising 42 topics, recorded from rituals received by Shaman Joshua Buck and Chief Abram Charles. In addition, Mr. Hewitt recorded in English translation three traditions, comprising 45 pages, purporting to relate events and to express ideas alleged to have led to the founding of the League of the Iroquois, showing naïvely the birth of the idea of human brotherhood and fellowhood in contradistinction to mere local tribalism.

Mr. Hewitt also made important discoveries regarding Iroquois social organization, namely, that certain so-called clans do not exist outside of the names used to designate them. For instance, the

"Ball" clan is in reality the Hawk clan; the "Hand" clan of the Cayuga is the Gray Wolf clan, and the "Potato" clan of that tribe is in fact a Duck clan or possibly a Wolf clan. This confusion has been due to popular acceptance of a sobriquet for the real name, hence the doubt in the last instance between the Duck and the Wolf, which it is probable will ultimately be removed. Mr. Hewitt was fortunate also in obtaining a set of wooden masks of the various wind gods, and also two masks of food gods—eight in all. He also procured the gourd rattle used by the late Chief John Buck, a medicine flute, and what was probably the last cradle-board with a beaded belt on the reservation.

On returning from the field early in July, Mr. Hewitt undertook at once the editing and copying of the texts of some of his material relating to the Iroquois League. Among these are the following, chiefly in the Onondaga language: (1) The eulogy of the grandsires and founders, one of the essential chants in the condolence ritual, in the version used by the "father side" of the league; (2) the laws governing federal chiefs in intertribal relations; (3) the laws relating to murder committed by a federal chief; (4) the charge made to a newly installed federal chief; (5) the important tradition of the Bear-foot episode; (6) the address made at the lodge of a deceased federal chief three days after his burial; and (7) the laws relating to the nomination and election of a candidate for a federal chiefship. Mr. Hewitt also commenced the translation of the extended "father-side" tradition of the founding of the League by the Deganawida and his associates, read the available proofs of Seneca Fiction, Legends, and Myths for the Thirty-second Annual Report, and supplied numerous technical data for use in responses to inquiries by correspondents.

Mr. Francis La Flesche, ethnologist, when not engaged in field work was occupied in assembling his notes on the Osage Indians, the greater portion of which consists of phonographic records taken from men versed in the tribal rituals, which evidently were composed for the preservation and transmission of the religious concepts of the tribe. Three forms are used in their construction, namely, recitation, song, and dramatic action. The spoken parts, called "wígie," are intoned by the masters of ceremony and by male members of the various gentes of the tribe who have memorized them. These wígie tell of the genesis of the tribe; they recount the stories of the adoption of life symbols and explain their significance, and narrate the finding and selection of the materials used in making the ceremonial paraphernalia. The songs used by the master of ceremonies, with the aid of a few chosen assistants, make the emotional appeal to the various symbols employed in the ritual. Ceremonial acts, processions, and dances accompany some of the songs and wígie.

The theme of these composite rites is the desire of the people for long, peaceful life and a never-ending line of descendants, and the ígie, songs, and dramatic acts constitute a supplication to the nseen power for aid toward the realization of this desire. The ever-ending life so devoutly sought for the tribe seemed to the eople to be exemplified in the unfailing recurrence of night and ay, in the constancy of the movements of the heavenly bodies, in he manifestation of a like desire among the living forms upon the arth, and thus to point to an ever-present unseen animating power o which the people must appeal for the granting of their prayers. n this appeal for never-ending life the Osage naturally personified, nd to a degree deified, those objects to which, as he thought, the unseen power had granted this form of life. Among these he included the vast space within which the heavenly bodies mysteriously moved and into which all living forms are born and exercise their functions. Thus all aspects of nature are made to play a part in the great drama of life as presented in these rituals.

Early in the year Mr. La Flesche finished transcribing the wígie, as well as his notes on two complete versions and a portion of a third version of the Child-naming rituals, comprising 107 typewritten pages. On completing this task he undertook the translation of the Osage personal names in current use and of arranging them by gentes. The Osage generally cling tenaciously to the ancient custom of ceremonially naming their children in the belief that the ceremonies aid the young in attaining old age. In this work Mr. La Flesche was able to determine that many members of the Osage tribe enrolled as full bloods are in reality of mixed blood. The tabulation of these names by sex and gentes, with their translations, together with a transcription of some characteristic tales, occupies 201 typewritten pages.

During the last four months of the fiscal year Mr. La Flesche was engaged in assembling his notes on the Fasting ritual of the Tsízhu Washtage gens. Most of the songs are quite different from those beonging to the Fasting rituals of the Hónga, while some of the wígie are the same, these being used in common with slight modifications among the different gentes. These Fasting rituals cover 139 completed pages, including the music.

A wígie was obtained by Mr. La Flesche from an old woman during his visit to the Osage in January, 1917. This wígie, which consists of 8 pages, fills a hiatus in the rush-mat ceremony previously recorded.

At the opening of the fiscal year Dr. Truman Michelson, ethnologist, was engaged in continuing his studies among the Sauk and Fox Indians of Iowa, the main work accomplished being the phonetic restoration of a long text, written in the current syllabary, on the origin of the white buffalo dance, intended for publication as a bulletin of the bureau. Considerable information pertaining to a number of sacred bundles of the Fox Indians was obtained, as well as various data of a sociological nature. Nearly 300 personal names were recorded, together with the names of the gentes to which their owners belonged; in this manner about nine-tenths of the population of the Fox Indians has been catalogued.

About the middle of August Dr. Michelson proceeded to Oklahoma where, with the cooperation of the Illinois Centennial Commission, he conducted researches among the Peoria. The ethnology of this tribe, properly speaking, has practically vanished, but their language and folklore still persist, though knowledge thereof is confined to only a few individuals. Contrary to ordinary belief, the Peoria language, phonetically, is extremely complicated. From notes left by the late Dr. A. S. Gatschet, it had been inferred that the Peoria belongs fundamentally with the Chippewa or Ojibwa group of central Algonquian languages, and this was fully confirmed. It is quite clear, however, that there has been another and more recent association with the Sauk, Fox, and Kickapoo group, and Peoria folklore and mythology also point to this double association. The system of consanguinity is clearly that of the Sauk, Fox, and Kickapoo group, rather than that of the Ojibwa. Dr. Michelson recorded, mostly in English, an almost exhaustive collection of Peoria folktales and myths.

After devoting about a month's time to the Peoria, Dr. Michelson returned to Iowa and renewed his work among the Sauk and Fox by making a phonetic restoration of a number of texts on minor sacred packs pertaining to the White Buffalo dance, as well as by recording about 200 pages of the extremely long myth of the Fox culture hero. Most of the ceremonies in connection with the presentation of a new drum of the so-called religious dance of the Potawatomi of Wisconsin were witnessed, as also were parts of a number of clan feasts.

On returning to Washington in November Dr. Michelson commenced the revision of the English translation of the texts relating to the White Buffalo dance, and devoted attention also to paragraphing and punctuating the Indian originals for the purpose of making them correspond with the English equivalents. By the close of the year the English translations were typewritten and put in almost final shape, while little work remained to complete the editing of the native texts.

Mr. J. P. Harrington, ethnologist, spent the entire year in continuation of his intensive study of the Chumashan tribes of California, obtaining a large body of important information which at present is in various stages of elaboration and which will comprise about 1,200 ewritten pages. From the beginning of the fiscal year until Sepiber 15 Mr. Harrington devoted his attention to the Purismeño lect, the existing vocabularies being corrected by the informant, l many new words and grammatical forms added. The next three eks were spent on the Obispeño with satisfactory results, inasmuch the material obtained in former years was more than doubled. e sole informant's feeble health made the recording of this maial unusually difficult, but it will prove to be of great local as well of general interest. The remainder of the fiscal year was devoted Ventureño and Ineseño. While not so nearly lost as Obispeño, it too late to obtain complete information on these dialects, but in process of their study many important points have been deterned. It is largely from their study that the picture of former umashan life must be reconstructed.

The study of the material culture of the Chumashan tribes has t been neglected, and in this work archeological material has en of assistance. Among the important points determined are tails concerning the making of the ancient deerskin dress of the men, which consisted of a large back flap and a smaller apron.

From the beginning of the fiscal year to the middle of January, 17, Dr. Leo J. Frachtenberg, special ethnologist, was engaged in ld work in the State of Washington, where he devoted special ention to the Quileute Indians and to collecting additional linistic and mythological material. The ethnologic investigations vered the subjects of history and distribution, manufacture, houses d households, clothing and ornaments, subsistence, travel and nsportation, warfare, games, and pastimes, social organization d festivals, social customs, religion, medicines, charms and current iefs, and art, and the recorded results consist of 577 manuscript ges. In addition, Dr. Frachtenberg recorded 156 native songs, luding words and translations; he also obtained several hundred tive drawings illustrating the material culture of the Quileute, d photographed a like number of ethnologic specimens. Furtherre, he materially added to his linguistic and ethnologic studies this people, commenced during the preceding year, by collecting eral thousand additional grammatical forms and phrases, and by ording 22 new native traditions with interlinear translations, and ree stories in English. These texts, in the form of field notes, comise 176 pages. While engaged in this field work Dr. Frachtenberg s instrumental in inducing Mrs. Martha Washburn of Neah Bay, r. and Mrs. Theo. R. Rixon of Clallam Bay, and Mrs. Fannie Taylor Mora, to give to the National Museum a part of their collections Makah and Quileute specimens, including two old totem poles, approximately 100 baskets, and more than 30 other ethnologic specimens. In addition to the Quileute studies mentioned, Dr. Frachtenberg collected 88 pages of Makah (Nootka) linguistic data, 57 pages of Quinault (Salish), and 18 pages of Clallam (Lkungen). While in Portland, Oreg., he obtained through the courtesy of the municipal authorities a fine collection of photographs representing several hundred archeological objects owned by the city.

Dr. Frachtenberg returned to Washington early in February. Subsequently, after conference with Dr. Franz Boas, honorary philologist of the bureau, it was arranged that Dr. Frachtenberg prepare for the Handbook of American Indian Languages comparative sketches of the Kalapuya, Molala, Klamath, and Quileute, and possibly one of the Salish languages. He also engaged in the final preparation of his paper Alsea Texts and Myths, which is now in process of printing as Bulletin 67. He next proceeded to prepare for publication the results of his earlier investigations of the language, ethnology, and mythology of the Kalapuya Indians, which will consist of two papers: A Grammatical Sketch of the Kalapuya Languages and Kalapuya Myths and Texts. The Kalapuya grammatical material consists of extended field notes gathered in 1913 and 1914, and of grammatical notes on the Atfalati collected by Dr. Gatschet in 1877. Dr. Gatschet's material, comprising 421 pages of field notes, is of inestimable value; indeed it is to the efforts of this untiring scholar that we owe the preservation of this most important dialect of the Kalapuya language, since he obtained his material, which includes also some valuable ethnologic data, from the last full-blood Atfalati. Dr. Frachtenberg's own material comprises several thousand grammatical forms, phrases, and vocables, and 32 native texts with interlinear translation—630 pages in all. The preparation of these linguistic data, as well as the work on the Kalapuya myths and texts, is well under way. Six of the texts, comprising 36 pages, have been prepared for publication; five of these are provided with interlinear translation and with voluminous notes in which attention is directed to the occurrence of similar myths among other tribes. During his studies of the Kalapuya languages Dr. Frachtenberg discovered that there is sufficient reason to believe that the Kalapuya, Takelman, and Chinookan languages are genetically related, the determination being based not only on lexical but also on structural and morphological material. This discovery tends to establish a connecting link between some of the languages of California and most of the languages spoken in Oregon.

During the last two weeks of the fiscal year Dr. Frachtenberg was temporarily detailed for special work in the Bureau of Investigation of the Department of Justice.

SPECIAL RESEARCHES.

Dr. Franz Boas, honorary philologist, completed the preparation his manuscript on the ethnology of the Kwakiutl Indians, about 700 pages of which was submitted to the bureau and assigned as e accompanying paper of the Thirty-fifth Annual Report, the com- sition of which was commenced before the close of the fiscal year. t the same time progress was made on the preparatory work for e second part of the memoir. Under Dr. Boas's direction Miss Mil- ed Downs listed the incidents of the Kwakiutl mythology prepara- ry to a discussion of the subject, and necessary additional informa- on for this purpose was obtained from Mr. George Hunt, of Fort upert, Vancouver Island. Mr. Hunt submitted in all 460 pages of anuscript in response to questions, and sent botanical specimens at have been identified through the kindness of Dr. N. L. Britton, irector of the New York Botanical Garden.

The manuscript for Bulletin 59, Kutenai Tales, has been completed. All the texts having been set up during the preceding year, the ab- tracts and comparative notes, referring to the pages of the bulletin, were written out (32 pages of printed matter), and a vocabulary 140 pages of manuscript) based on the text was prepared.

For the second part of the Handbook of American Indian Languages Dr. Frachtenberg submitted his sketch of the Alsea grammar, which will be prepared for publication as soon as a sufficient number f texts are available. Considerable progress has been made in the reparation of the Kutenai grammar. Owing to the impossibility f communicating with Mr. Bogoras in Russia, no progress has been ade in proof reading the Chukchee grammar, which has been in ype for more than three years, but which can not be completed with- ut submitting the proofs to the author. During the year, however, Dr. Boas revised the Eskimo texts by Mr. Bogoras, for which a brief thnological introduction has been written by Dr. Ernest Hawkes.

The results of the extended field work of Mr. James Teit, made ossible through the generosity of Mr. Homer E. Sargent of Chicago, re nearing completion. At the present time two manuscripts are well advanced. One of these, consisting of about 1,000 pages, pre- ared jointly by Dr. Boas and Dr. H. K. Haeberlin, was submitted n May, accompanied with a number of maps showing the distribution f Salishan dialects at various periods. It consists of a discussion f the characteristics of the various dialectic groups, comparative ocabularies on which the deductions are based, and a few simple exts. The material on which these studies are founded was collected rom field expeditions by Dr. Boas between 1886 and 1900, and by dditional material gathered by Mr. Teit between the latter date and he present year.

Dr. Haeberlin has also undertaken to discuss the Salishan basketry, for which purpose he has made detailed studies of various collections in the United States and Canada. In connection with this and other necessary researches on the Salishan tribes, Dr. Haeberlin visited British Columbia and Washington in 1915, and again in June, 1917, for the purpose of obtaining additional material. These expeditions were also made possible by the generosity of Mr. Sargent.

In his investigations Dr. Boas has had the valued help of Miss H. A. Andrews and Miss Mildred Downs.

In behalf of the bureau, Mr. W. H. Holmes, of the National Museum, visited New York, Boston, and Cambridge, for the purpose of studying archeological material in the museums of those cities in connection with the completion of Bulletin 60, Handbook of American Antiquities, part 1 of which is in type. The proof reading of this publication was well in hand at the close of the fiscal year, and progress was made by Mr. Holmes in the preparation of part 2.

The study of Indian music, undertaken by Miss Frances Densmore several years ago under the auspices of the bureau, was successfully continued through the year. The proof reading of Bulletin 61, Teton Sioux Music, was brought to completion. A second season of field work was devoted to the Ute Indians, sufficient data being obtained to complete a work on the music of that tribe. Of this material 73 new songs were transcribed and analyzed, 23 songs previously recorded were likewise analyzed, and 5 songs also previously submitted with analyses were further studied. Five group analyses, together with about 30 pages of manuscript description, were prepared. All except about 15 Ute records are now ready for publication; these cover a considerable variety of songs, analyses of which show important differences from songs of other tribes, one peculiarity being an added importance of rhythm.

For purposes of comparison, Miss Densmore undertook on her own account a study of primitive Slovak music, 10 songs of which were analyzed by the method employed in connection with Indian songs, and these were found to contain interesting points of difference.

Through the courtesy of Dr. Dayton C. Miller, of the Case School of Applied Science in Cleveland, Miss Densmore procured graphic evidence of peculiarities of drum and voice combination noted by ear in Indian music. Dr. Miller made two photographs, about 30 feet in length, each representing about 15 seconds' duration of sound. It is the intention to utilize part of these as illustrations in the forthcoming bulletin on Ute music, the songs photographed being Ute dance songs with strong rhythmic peculiarities.

Early in June Miss Densmore proceeded to the White Earth Reservation, Minnesota, for the purpose of conducting a study of the aterial culture of the Chippewa Indians, and at the close of the ar good progress was reported.

Mr. D. I Bushnell, jr., continued the preparation of the manuript for the Handbook of Aboriginal Remains East of the Misssippi, about 50,000 words being added to the material previously rnished, not including a portion that was rewritten as a result of a scovery of new and valuable information pertaining to certain calities. Introductions to the archeology of various States remain be written, but it is believed that both the manuscript and the lustrations for the entire bulletin will be completed before the close the fiscal year 1918.

Under the joint auspices of the bureau and the National Museum r. A. Hrdlička visited in October, 1916, a site at Vero, Fla., at hich were found certain human remains reputed to be of great ntiquity. As a summary account of Dr. Hrdlička's observations as already appeared in Smithsonian Miscellaneous Collections (vol. 6, no. 17, pp. 24–29, 1917) and an extended report will be published n Bulletin 66 of the bureau, now in press, it need only be mentioned hat a thorough inquiry has resulted decisively against the assumpion of great antiquity of the remains. The pottery and the bone nd stone objects found in association with the human burials are dentical with similar artifacts of the Florida and other southeastern ndians, while the bones themselves without exception exhibit modrn features, with numerous characteristics that permit their identication as purely Indian.

Owing to the fact that Dr. A. L. Kroeber, of the University of alifornia, found it expedient to elaborate certain portions of his andbook of the Indians of California, it was not practicable to ubmit the entire manuscript before the close of the fiscal year, but t this writing there is every prospect that the work will be ready or publication within a short time.

MANUSCRIPTS.

The following manuscripts, exclusive of those submitted for publiation, were received by the bureau:

Photostat copy of a San Blas vocabulary, recorded by Ensign J. M. Creighn, United States Navy, transmitted to the Smithsonian Institution by the ecretary of the Navy.

Philippine songs presented by Mr. E. H. Hammond, of Albuquerque, N. Mex.

Photograph of a picture writing on elk skin by Washakie, the Shoshoni chief, ith a key thereto.

Reports on prehistoric ruins in Arizona, with numerous photographs, preared by the late S. J. Holsinger, of the General Land Office, and deposited n the bureau by the United States Forest Service.

Abnaki hymns from John Tahamont, of Pierreville, Quebec, presented by eorge G. Heye, Esq.

PUBLICATIONS.

The editing of the publications of the bureau was continued through the year by Mr. J. G. Gurley, assisted as occasion required by Mrs. Frances S. Nichols. The status of the publications is presented in the following summary:

PUBLICATIONS ISSUED.

Thirty-first Annual Report. Accompanying paper: Tsimshian Mythology (Boas).

Coos, An Illustrative Sketch, separate (Frachtenberg), Bulletin 40, part 2 (Boas).

Bulletin 55, Ethnobotany of the Tewa Indians (Robbins, Harrington, Freire-Marreco).

List of Publications of the Bureau.

PUBLICATIONS IN PRESS OR IN PREPARATION.

Thirty-second Annual Report. Accompanying paper: Seneca Fiction, Legends, and Myths (Hewitt and Curtin).

Thirty-third Annual Report. Accompanying papers: (1) Uses of Plants by the Indians of the Nebraska Region (Gilmore); (2) Preliminary Account of the Antiquities of the Region between the Mancos and La Plata Rivers in Southwestern Colorado (Morris); (3) Designs on Prehistoric Hopi Pottery (Fewkes); (4) The Hawaiian Romance of Laie-i-ka-wai (Beckwith).

Thirty-fourth Annual Report. Accompanying paper: An Introductory Study of the Arts, Crafts, and Customs of the Guiana Indians (Roth).

Thirty-fifth Annual Report. Accompanying paper: Ethnology of the Kwakiutl Indians (Hunt, edited by Boas).

Bulletin 59, Kutenai Tales (Boas).

Bulletin 60, Handbook of Aboriginal American Antiquities. Part 1. Introductory: The Lithic Industries (Holmes).

Bulletin 61, Teton Sioux Music (Densmore).

Bulletin 63, Analytical and Critical Bibliography of the Tribes of Tierra del Fuego and Adjacent Territory (Cooper).

Bulletin 64, The Maya Indians of Southern Yucatan and Northern British Honduras (Gann).

Bulletin 65, Archeological Explorations in Northeastern Arizona (Kidder and Guernsey).

Bulletin 66, Recent Discoveries of Remains Attributed to Early Man in America (Hrdlička).

Bulletin 67, Alsea Texts and Myths (Frachtenberg).

The distribution of publications has been continued under the immediate charge of Miss Helen Munroe and at times by Mr. E. L. Springer, of the Smithsonian Institution, assisted during the first part of the year by Miss Lana V. Schelski, and latterly by Miss Ora A. Sowersby, stenographer and typewriter. Notwithstanding conditions incident to the war and the consequent necessity of withhold-ing the transmission of various foreign shipments, publications were distributed as follows:

	Copies.
Annual reports and separates	5,954
Bulletins and separates	5,804
Contributions to North American Ethnology and separates	28
Introductions	7
Miscellaneous publications	191
Total	11,984

ILLUSTRATIONS.

Mr. DeLancey Gill, with the assistance of Mr. Albert E. Sweeney, continued the preparation of the illustrations required for the publications of the bureau and devoted the usual attention to photographing visiting Indians. The results of this work may be summarized as follows:

Photographic prints for distribution and office use	578
Negatives of ethnologic and archeologic subjects	173
Negative films developed from field exposures	214
Photostat prints from books and manuscripts	950
Drawings made	54
Mounts used	62
Portrait negatives of visiting Indians (Creek 9, Arapaho 4, Cheyenne 16)	29
Negatives retouched	75
Illustration proofs examined at Government Printing Office	9,000
Illustrations submitted for reproduction and engraver's proofs edited	781

LIBRARY.

The reference library of the bureau continued in the immediate care of Miss Ella Leary, librarian, assisted by Mr. Charles B. Newman. During the year 435 books were accessioned, of which 97 were purchased, 286 acquired by gift or exchange, and 52 by the entry of newly bound volumes of periodicals previously received. In addition the bureau acquired 388 pamphlets. The aggregate number of books in the library at the close of the year was 21,750; of pamphlets, about 13,848. In addition there are many volumes of unbound periodicals. Several new periodicals were added to the exchange list and about 50 defective series were either wholly or partly completed. As might be expected, the publication of various European periodicals devoted to anthropology has either been suspended or has ceased entirely. Largely with the assistance of Mrs. Frances S. Nichols many of the older books and pamphlets were newly catalogued by both subject and author, and thus made more readily available. Of 133 volumes sent to the bindery about half were returned before the close of the year. Books borrowed from the Library of Congress numbered about 400.

COLLECTIONS.

The following collections were acquired by the bureau, by members of its staff, or by those detailed in connection with its researches, and have been transferred to the National Museum:

Six ethnologic objects from British Guiana, presented by Dr. Walter E. Roth, of Marlborough, Pomeroon River, British Guiana. (60049.)

A small collection of archeological objects of earthenware, jadeite, etc., from the Kiché district of Totonicopan, Guatemala. (61097.)

A collection of archeological objects, including human bones, gathered by Mr. Neil M. Judd in Utah. (60194.)

Seven specimens found by Mr. Joseph Dame in Millard County, Utah, and purchased from him through Mr. Neil M. Judd. (60105.)

A collection of archeological objects and skeletal material gathered by Dr. Walter Hough at the Luna pit village in western New Mexico. (60196.)

Ten baskets of the Guiana Indians of South America, presented to the bureau by Dr. Walter E. Roth, of Marlborough, Pomeroon River, British Guiana. (60452.)

Seventeen prehistoric pottery vessels, one piece of matting, and a few small objects collected by F. W. Hodge in a cist in a cave in a southern wall of Cibolita Valley, Valencia County, N. Mex. (60453.)

Twenty-five archeological specimens gathered by Dr. J. Walter Fewkes from ancient ruins near Gallup, N. Mex. (60502.)

A small black-ware vase from Santa Clara pueblo, New Mexico, presented by Robert H. Chapman, of Washington, D. C. (60826.)

Twelve stone artifacts from Reeves Mill, near Pitman, Gloucester County, N. J., presented by Mrs. M. B. C. Shuman. (60836.)

Archeological material collected by Dr. J. Walter Fewkes from excavations conducted at Mummy Lake Ruins, Mesa Verde National Park, Colo. (60880.)

Archeological material collected by Dr. J. Walter Fewkes from excavations conducted at Oak Tree House, Mesa Verde National Park, Colo. (60901.)

An Assiniboin headdress from Alberta, Canada, presented by Mr. Robert H. Chapman, Washington, D. C. (61007.)

Skulls, skeletons, and parts of skeletons, an Indian ornament embedded in stone, and pottery fragments, collected in the vicinity of Vero and Fort Myers, Fla., by Dr. A. Hrdlička. (61291.)

Seven baskets made by the Koasati Indians of Louisiana, collected by Dr. John R. Swanton. (61315.)

PROPERTY.

Furniture was purchased to the amount of $196.25; the cost of typewriting machines was $206, and of a camera $10.50, making a total of $412.75 expended for furniture and apparatus. On the whole the furniture of the bureau is in good condition, but there are a few unserviceable pieces that should be replaced, while need of a few filing cases for current notes and manuscripts is felt.

MISCELLANEOUS.

Quarters.—One of the rooms on the third floor of the north tower of the Smithsonian building, occupied by the bureau, was painted, and the electric-lighting of three rooms improved.

Personnel.—The only change in the personnel of the bureau was the appointment of Miss Ora A. Sowersby, stenographer and typewriter, on February 14, 1917, to succeed Miss Lana V. Schelski, transferred. A temporary laborer was employed from time to time when required.

Clerical.—The correspondence and other clerical work of the office, including the copying of manuscripts, has been conducted with the aid of Miss Florence M. Poast, clerk to the ethnologist-in-charge; Miss May S. Clark, and Mrs. Frances S. Nichols. Miss Sowersby was assigned to the division of publications of the Smithsonian Institution for duty in connection with correspondence arising from the distribution of the bureau's publications.

Respectfully submitted.

F. W. HODGE,
Ethnologist-in-Charge.

Dr. CHARLES D. WALCOTT,
Secretary of the Smithsonian Institution.

APPENDIX 3.

REPORT ON THE INTERNATIONAL EXCHANGES.

SIR: I have the honor to submit the following report on the operations of the International Exchange Service during the fiscal year ending June 30, 1917.

The regular congressional appropriation for the support of the Service during the year, including the allotment for printing and binding, was $32,200, but in order to enable the Institution to meet the very high ocean freight rates on foreign shipments Congress granted an additional appropriation of $3,500. The repayments from departmental and other establishments aggregated $3,687.58, making the total available resources for carrying on the system of exchanges $39,387.58.

During the year 1917 the total number of packages handled was 268.625, which weighed 290.193 pounds.

The number and weight of the packages of different classes are indicated in the following table:

	Packages.		Weight (pounds).	
	Sent.	Received.	Sent.	Received.
United States parliamentary documents sent abroad	137,863	....	55,376	....
Publications received in return for parliamentary documents	....	3,416	....	7,646
United States departmental documents sent abroad	60,948	....	116,519	....
Publications received in return for departmental documents	....	6,333	....	6,304
Miscellaneous scientific and literary publications sent abroad	37,111	....	68,334	....
Miscellaneous scientific and literary publications received from abroad for distribution in the United States	....	22,954	....	36,012
Total	235,922	32,703	240,229	49,962
Grand total	268,625		290,191	

As referred to in previous reports, many returns for publications sent abroad reach their destinations in this country direct by mail and not through the Exchange Service.

Shipments are still suspended to Austria, Belgium, Bulgaria, Germany, Hungary, Montenegro, Roumania, Russia, Serbia, and Turkey. Shipments both to and from Germany, which were arranged by the nstitution through the State Department, as referred to in the last eport, were discontinued at the outbreak of hostilities between the United States and Germany. The further efforts of the Russian Commission of International Exchanges to resume shipments were ot successful, and the commission stated that it would be necessary o withhold consignments until the end of the war.

In accordance with the proclamation of the British Government prohibiting the importation into the United Kingdom of books in bulk, it was necessary to suspend shipments to that country for a ime. However, the London agents of the Institution, Messrs. Wil-liam Wesley & Son, succeeded in procuring from the Royal Commis-ion on Paper a special license to import consignments of interna-ional exchanges into England. Owing to the lack of requisite ocean ransportation facilities, it was also necessary to suspend shipments for a time to Norway, Sweden, Denmark, and Holland.

The director of the Government Press at Cairo advises the Institution that four boxes of Egyptian exchanges en route to this country were lost at sea, and suggests that shipments be withheld until the end of the war. This suggestion will be followed. On account of the abnormal conditions in the Mediterranean, shipments to Greece will also be suspended.

Since the beginning of the war the Institution has suffered the loss of only three shipments from hostile action. One small shipment—consisting of 24 governmental documents—was lost in transit to India during the first year of the war. Through the sinking of a vessel by a warship during the past year 18 packages in transit to India were also lost. Twenty-one boxes for the French Bureau of Exchanges were lost when the steamship *Juno* was torpedoed in February last. Nineteen of these contained miscellaneous governmental and scientific publications for distribution to various addresses throughout France and the other two the regular series of United States official documents for deposit in the National Library at Paris and the office of the prefect of the Seine.

In the early part of the present fiscal year the Italian Exchange office in Rome reported that one of the boxes of the consignment ent to that office in July, 1915, had not been delivered. Steps taken o have the box traced were unsuccessful.

Wherever possible the Institution has, as formerly in the case of ost consignments, procured duplicate copies of the publications con-ained in the above-mentioned boxes.

The Government publications office at Bulaq—which acts as the Egyptian Exchange agency—has kindly taken charge until the close f the war of a box addressed to the Jewish Agricultural Experi-ment Station, Haifa, Palestine, which was detained at Alexandria.

I am pleased to state that the four boxes held at Bahia, Brazil, to which reference was made in the 1915 report, have been released and forwarded to the Government printing works at Pretoria.

Reference has previously been made to the custom of the Government of India to refer requests from establishments in this country for Indian official documents to the Exchange Service for indorsement. The director of the Government Press at Cairo has requested that the Institution take similar action on applications for Egyptian official publications. This request has been granted.

Of the 1,217 boxes used in forwarding exchanges to foreign agencies for distribution during 1917, 170 contained full sets of United States official documents for authorized depositories, and 1,047 were filled with departmental and other publications for depositories of partial sets and for miscellaneous correspondents. The number of boxes sent to each foreign country and the dates of transmission are shown in the following table:

Consignments of exchanges for foreign countries.

Country.	Number of boxes.	Date of transmission.
Argentina	43	July 23, Sept. 13, Nov. 15, 1916; Jan. 13, Mar. 20, June 8, 1917.
Barbados	1	May 28, 1917.
Bolivia	2	Aug. 29, 1916; Mar. 31, 1917.
Brazil	25	July 25, Sept. 14, Nov. 15, 1916; Jan. 15, Mar. 28, June 9, 1917.
British Colonies	8	July 19, Aug. 3, 23, Sept. 11, Oct. 9, Nov. 1, 24, Dec. 20, 1916; Feb. 7, Apr. 14, 1917.
British Guiana	2	Sept. 21, 1916; Feb. 16, 1917.
Canada	16	Sept. 25, Dec. 18, 1916; Feb. 17, May 17, 1917.
Chile	19	July 26, Sept. 16, Nov. 16, 1916; Jan. 16, Mar. 29, June 11, 1917.
China	26	Sept. 5, Oct. 25, Nov. 28, 1916; Feb. 8, Mar. 8, May 23, 1917.
Colombia	33	July 16, Oct. 7, Nov. 12, Dec. 13, 1916; May 19, 1917.
Costa Rica	12	Aug. 12, Oct. 25, 1916; Jan. 17, Mar. 30, Apr. 6, June 13, 1917.
Cuba	4	Sept. 25, Dec. 18, 1916; Feb. 17, May 17, 1917.
Denmark	20	Aug. 9, Sept. 29, 1916; Jan. 6, Mar. 12, May 21, 1917.
Ecuador	4	Aug. 3, 1916; Apr. 10, 1917.
Egypt	8	Aug. 11, 1916; May 16, 1917.
France	123	July 10, Aug. 18, Oct. 12, Nov. 14, 1916; Jan. 10, Mar. 21, May 9, 1917.
Germany	48	Dec. 16, 1916.
Great Britain and Ireland	250	July 20, Aug. 3, 23, Sept. 11, Oct. 9, Nov. 1, 24, Dec. 20, 1916; Feb. 7, Apr. 11, 18, June 6, 1917.
Greece	7	Aug. 14, Nov. 9, 1916.
Guatemala	2	Aug. 30, 1916; Apr. 6, 1917.
Haiti	4	Sept. 25, Dec. 18, 1916; Feb. 17, May 17, 1917.
Honduras	2	Aug. 30, 1916; Apr. 4, 1917.
India	30	July 19, Aug. 3, 23, Sept. 11, Oct. 9, Nov. 1, 24, Dec. 20, 1916; Feb. 7, Apr. 14, 1917.
Italy	90	July 6, Aug. 4, Sept. 22, Nov. 10, Dec. 23, 1916; Jan. 20, Apr. 20, June 4, 1917.
Jamaica	5	Aug. 29, 1916; Feb. 9, May 24, 1917.
Japan	50	July 7, Aug. 16, Nov. 28, 1916; Jan. 19, Mar. 2, May 13, 1917.

Consignments of exchanges for foreign countries—Continued.

ountry.	Number of boxes.	Date of transmission.
....	1	Aug. 30, 1916.
....	2	Aug. 29, 1916; May 28, 1917.
larquez............	1	May 29, 1917.
....	4	Sept. 25, Dec. 18, 1916; Feb. 17, May 17, 1917.
s..................	30	July 7, Aug. 5, Sept. 25, Nov. 8, 1916; Jan. 5, 1917.
Wales............	43	July 20, Aug. 26, Sept. 25, Oct. 16, Dec. 5, 1916; Jan. 13, Feb. 15, Apr. 16, June 19, 1917.
d................	17	July 20, Aug. 26, Oct. 20, Dec. 12, 1916; Feb. 13, Apr. 17, June 21, 1917.
....	2	Aug. 30, 1916; Apr. 10. 1917.
....	13	Aug. 9, Sept. 26, Nov. 11, 1916; Jan. 6, Mar. 14, 1917.
....	1	Aug. 30, 1916.
....	12	July 26, Sept. 16, Nov. 16, 1916; Mar. 29, June 12, 1917.
....	15	Aug. 10, Sept. 28, Nov. 20, 1916; Mar. 15, May 22, 1917.
....	11	July 20, Aug. 26, Oct. 20, Dec. 12, 1916; Feb. 15, Apr. 17, June 21, 1917.
....	4	Aug. 3, 1916; Apr. 7, 1917.
....	3	Aug. 30, 1916; Feb. 16, 1917 .
ralia...............	18	July 20, Aug. 26, Oct. 18, Dec. 18, 1916; Feb. 12, Apr. 17, June 20, 1917.
....	22	Aug. 11, Sept. 30, Nov. 17, 1916; Jan. 11, May 14, 1917.
....	43	Aug. 9, Sept. 27, Nov. 11, 1916; Jan. 18, May 1, 1917.
l..................	52	Sept. 25, Aug. 9, Nov. 11, 1916; Jan. 10, May 9, 1917.
....	10	July 19, Aug. 3, 23, Sept. 11, Oct. 9, Nov. 1, 24, Dec. 20, 1916; Jan. 10, Mar. 21, May 9, 1917.
....	2	Aug. 29, 1916; May 25, 1917.
uth Africa.........	17	July 6, Sept. 20, Nov. 13, 1916; Jan. 19, 1917.
....	15	July 27, Sept. 16, Nov. 17, 1916; Jan. 17, Mar. 29, June 13, 1917.
....	10	Aug. 12, Oct. 26, 1916; Jan. 17, Mar. 29, June 13, 1917.
....	22	July 20, Aug. 26, Oct. 17, Dec. 9, 1916.
stralia.............	12	July 19, Aug. 3, 23, Sept. 11, Oct. 9, Nov. 1, 24, Dec. 20, Feb. 7, Apr. 14, 1917.
and Leeward Is-	1	May 28, 1917.

N DEPOSITORIES OF UNITED STATES GOVERNMENTAL DOCUMENTS.

ty-one sets of United States governmental documents were
d for distribution to foreign depositories in accordance with
stipulations and under the authority of the congressional
ions of March 2, 1867, and March 2, 1901. A communica-
s received during the year from the assistant secretary to the
ment of India, department of education, stating that the
States governmental documents sent to his department are
over to the Imperial Library at Calcutta, and requesting that
consignments be addressed directly to that library.

t of the foreign depositories is given below. Consignments
se countries to which shipments are suspended on account of

the war are being held at the Institution for transmission to the various depositories at the close of hostilities.

DEPOSITORIES OF FULL SETS.

Argentina: Ministerio de Relaciones Exteriores, Buenos Aires.
Australia: Library of the Commonwealth Parliament, Melbourne.
Austria: K. K. Statistische Zentral-Kommission, Vienna.
Baden: Universitäts-Bibliothek, Freiburg. (Depository of the Grand Duchy of Baden.)
Bavaria: Königliche Hof- und Staats-Bibliothek, Munich.
Belgium: Bibliothèque Royale, Brussels.
Brazil: Bibliotheca Nacional, Rio de Janeiro.
Buenos Aires: Biblioteca de la Universidad Nacional de La Plata. (Depository of the Province of Buenos Aires.)
Canada: Library of Parliament, Ottawa.
Chile: Biblioteca del Congreso Nacional, Santiago.
China: American-Chinese Publication Exchange Department, Shanghai Bureau of Foreign Affairs, Shanghai.
Colombia: Biblioteca Nacional, Bogotá.
Costa Rica: Oficina de Depósito y Canje Internacional de Publicaciones, San José.
Cuba: Secretaria de Estado (Asuntos Generales y Canje Internacional), Habana.
Denmark: Kongelige Bibliotheket, Copenhagen.
England: British Museum, London.
France: Bibliothèque Nationale, Paris.
Germany: Deutsche Reichstags-Bibliothek, Berlin.
Glasgow: City Librarian, Mitchell Library, Glasgow.
Greece: Bibliothèque Nationale, Athens.
Haiti: Secrétaire d'État des Relations Extérieures, Port au Prince.
Hungary: Hungarian House of Delegates, Budapest.
India: Imperial Library, Calcutta.
Ireland: National Library of Ireland, Dublin.
Italy: Biblioteca Nazionale Vittorio Emanuele, Rome.
Japan: Imperial Library of Japan, Tokyo.
London: London School of Economics and Political Science. (Depository of the London County Council.)
Manitoba: Provincial Library, Winnipeg.
Mexico: Instituto Bibliográfico, Biblioteca Nacional, Mexico.
Netherlands: Library of the States General, The Hague.
New South Wales: Public Library of New South Wales, Sydney.
New Zealand: General Assembly Library, Wellington.
Norway: Storthingets Bibliothek, Christiania.
Ontario: Legislative Library, Toronto.
Paris: Préfecture de la Seine.
Peru: Biblioteca Nacional, Lima.
Portugal: Bibliotheca Nacional, Lisbon.
Prussia: Königliche Bibliothek, Berlin.
Quebec: Library of the Legislature of the Province of Quebec, Quebec.
Queensland: Parliamentary Library, Brisbane.
Russia: Imperial Public Library, Petrograd.
Saxony: Königliche Oeffentliche Bibliothek, Dresden.
Serbia: Section Administrative du Ministère des Affaires Étrangères, Belgrade.

TH AUSTRALIA: Parliamentary Library, Adelaide.
AIN: Servicio del Cambio Internacional de Publicaciones, Cuerpo Facultativo de Archiveros, Bibliotecarios y Arqueólogos, Madrid.
EDEN: Kungliga Biblioteket, Stockholm.
ITZERLAND: Bibliothèque Fédérale, Berne.
SMANIA: Parliamentary Library, Hobart.
RKEY: Department of Public Instruction, Constantinople.
ION OF SOUTH AFRICA: State Library, Pretoria, Transvaal.
UGUAY: Oficina de Canje Internacional de Publicaciones, Montevidio.
NEZUELA: Biblioteca Nacional, Caracas.
CTORIA: Public Library, Melbourne.
ESTERN AUSTRALIA: Public Library of Western Australia, Perth.
ÜRTTEMBERG: Königliche Landesbibliothek, Stuttgart.

DEPOSITORIES OF PARTIAL SETS.

BERTA: Provincial Library, Edmonton.
SACE-LORRAINE: K. Ministerium für Elsass-Lothringen, Strassburg.
LIVIA: Ministerio de Colonización y Agricultura, La Paz.
EMEN: Senatskommission für Reichs- und Auswärtige Angelegenheiten.
ITISH COLUMBIA: Legislative Library, Victoria.
ITISH GUIANA: Government Secretary's Office, Georgetown, Demerara.
LGARIA: Minister of Foreign Affairs, Sofia.
YLON: Colonial Secretary's Office (Record Department of the Library), Colombo.
UADOR: Biblioteca Nacional, Quito.
YPT: Bibliothèque Khédiviale, Cairo.
NLAND: Chancery of Governor, Helsingfors.
ATEMALA: Secretary of the Government, Guatemala.
MBURG: Senatskommission für die Reichs- und Auswärtigen Angelegenheiten.
SSE: Grossherzogliche Hof-Bibliothek, Darmstadt.
NDURAS: Secretary of the Government, Tegucigalpa.
MAICA: Colonial Secretary, Kingston.
BERIA: Department of State, Monrovia.
URENÇO MARQUEZ: Government Library, Lourenço Marquez.
BECK: President of the Senate.
DRAS, PROVINCE OF: Chief Secretary to the Government of Madras, Public Department, Madras.
LTA: Lieutenant Governor, Valetta.
NTENEGRO: Ministère des Affaires Étrangères, Cetinje.
W BRUNSWICK: Legislative Library, Fredericton.
WFOUNDLAND: Colonial Secretary, St. John's.
ARAGUA: Superintendente de Archivos Nacionales, Managua.
RTHWEST TERRITORIES: Government Library, Regina.
VA SCOTIA: Provincial Secretary of Nova Scotia, Halifax.
NAMA: Secretaria de Relaciones Exteriores, Panama.
RAGUAY: Oficina General de Inmigracion, Asuncion.
INCE EDWARD ISLAND: Legislative Library, Charlottetown.
UMANIA: Academia Romana, Bucharest.
LVADOR: Ministerio de Relaciones Exteriores, San Salvador.
AM: Department of Foreign Affairs, Bangkok.
RAITS SETTLEMENTS: Colonial Secretary, Singapore.
ITED PROVINCES OF AGRA AND OUDH: Under Secretary to Government, Allahabad.
ENNA: Bürgermeister der Haupt- und Residenz-Stadt.

INTERPARLIAMENTARY EXCHANGE OF OFFICIAL JOURNALS.

Following is a complete list of the governments to which copies of the daily issue of the Congressional Record are now sent. The records for those countries to which it is not possible to forward consignments at present are being held at the Institution:

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Australia.
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France.
Great Britain.
Greece.
Guatemala.
Honduras.
Hungary.
Italy.
Liberia.
New South Wales.
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Peru.
Portugal.
Prussia.
Queensland.
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Russia.
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Spain.
Switzerland.
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Union of South Africa.
Uruguay.
Venezuela.
Western Australia.

LIST OF BUREAUS OR AGENCIES THROUGH WHICH EXCHANGES ARE TRANSMITTED.

The following is a list of the bureaus or agencies through which exchanges are transmitted:

Algeria, *via* France.

Angola, *via* Portugal.

Argentina: Comisión Protectora de Bibliotecas Populares, Santa Fé 880, Buenos Aires.

Austria: K. K. Statistische Zentral-Kommission, Vienna.[1]

Azores, *via* Portugal.

Belgium: Service Belge des Échanges Internationaux, Rue des Longs-Chariots 46, Brussels.[1]

Bolivia: Oficina Nacional de Estadística, La Paz.

Brazil: Serviço de Permutações Internacionaes, Bibliotheca Nacional, Rio de Janeiro.

British Colonies: Crown Agents for the Colonies, London.

British Guiana: Royal Agricultural and Commercial Society, Georgetown.

British Honduras: Colonial Secretary, Belize.

Bulgaria: Institutions Scientifiques de S. M. le Roi de Bulgarie, Sofia.[1]

Canary Islands, *via* Spain.

Chile: Servicio de Canjes Internacionales, Biblioteca Nacional, Santiago.

China: American-Chinese Publication Exchange Department, Shanghai Bureau of Foreign Affairs, Shanghai.

Colombia: Oficina de Canjes Internacionales y Reparto, Biblioteca Nacional, Bogotá.

Costa Rica: Oficina de Depósito y Canje Internacional de Publicaciones, San José.

Denmark: Kongelige Danske Videnskabernes Selskab, Copenhagen.

Dutch Guiana: Surinaamsche Koloniale Bibliotheek, Paramaribo.

Ecuador: Ministerio de Relaciones Exteriores, Quito.

Egypt: Government Publications Office, Printing Department, Cairo.[1]

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[1] Shipments suspended on account of the war.

ANCE: Service Français des Échanges Internationaux, 110 Rue de Grenelle, Paris.

RMANY: Amerika-Institut, Berlin, N. W. 7.[1]

EAT BRITAIN AND IRELAND: Messrs. William Wesley & Son, 28 Essex Street, Strand, London.

EECE: Bibliothèque Nationale, Athens.[1]

EENLAND, *via* Denmark.

UADELOUPE, *via* France.

UATEMALA: Instituto Nacional de Varones, Guatemala.

UINEA, *via* Portugal.

AITI: Secrétaire d'État des Relations Extérieures, Port au Prince.

ONDURAS: Biblioteca Nacional, Tegucigalpa.

UNGARY: Dr. Julius Pikler, Municipal Office of Statistics, Váci-utca 80, Budapest.[1]

ELAND, *via* Denmark.

NDIA: India Store Department, India Office, London.

TALY: Ufficio degli Scambi Internazionali, Biblioteca Nazionale Vittorio Emanuele, Rome.

AMAICA: Institute of Jamaica, Kingston.

APAN: Imperial Library of Japan, Tokyo.

AVA, *via* Netherlands.

OREA: Government General, Keijo.

IBERIA: Bureau of Exchanges, Department of State, Monrovia.

OURENÇO MARQUEZ: Government Library, Lourenço Marquez.

UXEMBURG, *via* Germany.

ADAGASCAR, *via* France.

ADEIRA, *via* Portugal.

ONTENEGRO: Ministère des Affaires Étrangères, Cetinje.[1]

OZAMBIQUE, *via* Portugal.

ETHERLANDS: Bureau Scientifique Central Néerlandais, Bibliothèque de l'Université, Leyden.

EW GUINEA, *via* Netherlands.

EW SOUTH WALES: Public Library of New South Wales, Sydney.

EW ZEALAND: Dominion Museum, Wellington.

ICARAGUA: Ministerio de Relaciones Exteriores, Managua.

ORWAY: Kongelige Norske Frederiks Universitet Bibliotheket, Christiania.

ANAMA: Secretaria de Relaciones Exteriores, Panama.

ARAGUAY: Servicio de Canje Internacional de Publicaciones, Sección Consular y de Comercio, Ministerio de Relaciones Exteriores, Asuncion.

ERSIA: Board of Foreign Missions of the Presbyterian Church, New York City.

ERU: Oficino de Reparto, Depósito y Canje Internacional de Publicaciones, Ministerio de Fomento, Lima.

ORTUGAL: Serviço de Permutações Internacionaes, Inspecção Geral das Bibliothecas e Archivos Publicos, Lisbon.

UEENSLAND: Bureau of Exchanges of International Publications, Chief Secretary's Office, Brisbane.

OUMANIA: Academia Romana, Bucharest.[1]

USSIA: Commission Russe des Échanges Internationaux, Bibliothèque Impériale Publique, Petrograd.[1]

ALVADOR: Ministerio de Relaciones Exteriores, San Salvador.

ERBIA: Section Administrative du Ministère des Affaires Étrangères, Belgrade.[1]

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[1] Shipments suspended on account of the war.

Siam: Department of Foreign Affairs, Bangkok.

South Australia: Public Library of South Australia, Adelaide.

Spain: Servicio del Cambio Internacional de Publicaciones, Cuerpo Facultativo de Archiveros, Bibliotecarios y Arqueólogos, Madrid.

Sumatra, *via* Netherlands.

Sweden: Kongliga Svenska Vetenskaps Akademien, Stockholm.

Switzerland: Service des Échanges Internationaux, Bibliothèque Fédérale Centrale, Berne.

Syria: Board of Foreign Missions of the Presbyterian Church, New York.

Tasmania: Secretary to the Premier, Hobart.

Trinidad: Royal Victoria Institute of Trinidad and Tobago, Port-of-Spain.

Tunis, *via* France.

Turkey: American Board of Commissioners for Foreign Missions, Boston.[1]

Union of South Africa: Government Printing Works, Pretoria, Transvaal.

Uruguay: Oficina de Canje Internacional, Montevideo.

Venezuela: Biblioteca Nacional, Caracas.

Victoria: Public Library of Victoria, Melbourne.

Western Australia: Public Library of Western Australia, Perth.

Windward and Leeward Islands: Imperial Department of Agriculture, Bridgetown, Barbados.

Respectfully submitted.

C. W. Shoemaker,
Chief Clerk, International Exchange Service.

Dr. Charles D. Walcott,
Secretary of the Smithsonian Institution.
August 15, 1917.

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[1] Shipments suspended on account of the war.

APPENDIX 4.

REPORT ON THE NATIONAL ZOOLOGICAL PARK.

IR: I have the honor to submit the following report on the opera- ıs of the National Zoological Park for the fiscal year ending ıe 30, 1917:

'here was allowed by Congress in the sundry civil bill the sum of 0,000 for all expenses, except printing and binding, for which 0 additional was granted.

'he continued increase from year to year in the cost of nearly all plies used at the park has so greatly enlarged the bills for intenance expenses that very little could be done this year in the , of permanent improvements on buildings and grounds. The ections have, nevertheless, been kept in excellent condition and nearly the normal numbers, though much-needed repairs and rations, for the comfort and safety of the public, or to improve sing conditions of animals, could not be made. The number of cimens is slightly below that for a number of years, but the actual ıe and scientific importance of the collection is probably as great ıt any time in the history of the park.

n October, 1916, Dr. Frank Baker, for 26 years the superin- lent, tendered his resignation to take effect November 1. To quote n an editorial in the Washington Times of October 6, entitled ıe Loss of Dr. Baker":

> ıe resignation of Dr. Frank Baker as superintendent of the National ogical Park marks the close of 26 years of valuable service in that ıcity.
>
> reading of the reports of the Smithsonian Institution shows how much Zoo here has developed under Dr. Baker, until it now possesses one of the t varied and interesting collections of animals of any such institution in country.
>
> he average citizen does not bother much about zoos except as a form of day afternoon entertainment for children. But the educational value of the ːs is becoming more generally recognized. School children of Washington now sent to the Zoo to observe the animals, and they can learn and assimi- much more there in a few visits than they could accumulate in weeks of lying geographies.
>
> s a professor of anatomy for 33 years at Georgetown University, as presi- : of the National Association of Anatomists, and as an active member of a dozen other scientific bodies, Dr. Baker has also attained note outside

his work at the Zoo. His capacity for work is suggested in the calm announcement that he, at the age of 75 years, must retire from the Zoo, not to seek leisure, but because of the pressure of other duties. Dr. Baker is one of a notable group of scientists to be found in Washington whose reputation is world-wide.

ACCESSIONS.

Gifts.—Animals to the number of 99 were presented by friends of the park, or placed on indefinite deposit. These include many of the more common species of the native fauna as well as some especially desirable animals rarely obtained.

One of the most notable gifts was that of five adult Rocky Mountain sheep received from the Canadian Government, through Mr. J. B. Harkin, commissioner of Dominion parks. These animals were captured in the Rocky Mountains Park near Banff, Alberta, and reached Washington March 7 in perfect condition. The shipment included one 5-year-old ram, a younger ram, and three ewes. A ewe lamb was born on May 27. Two paddocks were opened together to give the sheep sufficient range, and the exhibit is one of the most important now shown by the park. The animals are doing well to date and although the wild sheep is one of the species most difficult to keep in eastern zoological gardens it is hoped that the animals comprising this accession may be kept on show for a considerable time. The Duke of Bedford made a further gift of four Bedford deer, or Manchurian stags, from his collection at Woburn Abbey, England. The Bedford deer (*Cervus xanthopygus*) is one of a large group of Old World deer related to the American elk or wapiti, and has not heretofore been exhibited. The animals received have been given a commodious yard bordering the creek on the eastern side of the park, near the yaks, and are doing splendidly in their new home. A thrifty fawn was born June 14. Mr. Victor J. Evans, of Washington, D. C., showed continued interest in the exhibit by depositing some desirable Australian marsupials, including two wombats and a nail-tailed wallaby, both new to the collection.

The complete list of the donors and gifts is as follows:

Adams Express Co., Washington, D. C., mink.

Mr. and Mrs. Carl E. Akeley, New York City, vervet monkey and a bonnet monkey.

Mrs. Ida Bangs, Washington, D. C., yellow-naped parrot.

Mr. J. C. Beard, Brightwood, D. C., two barred owls.

The Duke of Bedford, Woburn Abbey, England, four Bedford deer.

Mr. C. E. Brewster and Dr. F. Kent, Eagle Pass, Tex., Inca dove, a hybrid quail, and eight chestnut-bellied scaled quails.

Mrs. C. S. Briggs, Washington, D. C., alligator.

Mrs. F. S. Brown, Washington, D. C., sparrowhawk.

Postmaster General Burleson, Washington, D. C., alligator.

Mrs. E. Caminetti, Washington, D. C., yellow rail.

nadian Government, through Hon. J. B. Harkin, five Rocky Mountain
.
of. W. E. Castle, Bussey Institution, Harvard University, four Peruvian
guinea-pigs.
s. Chatham, Washington, D. C., yellow-headed parrot.
. D. Crovo, Washington, D. C., boa constrictor and a murine opossum.
. John O. Darlington, Washington, D. C., two alligators.
. Ned Dearborn, Laurel, Md., common ferret.
. R. E. Dunham, Allegan, Mich., alligator.
. W. O. Emery, Washington, D. C., Cooper's hawk.
. Victor J. Evans, Washington, D. C., nail-tailed wallaby and two wombats.
. E. G. Fletcher, Washington, D. C., alligator.
. J. M. Frank, jr., Washington, D. C., alligator.
rs. W. S. Groh, Burke, Va., alligator.
r. M. E. Heeter, Washington, D. C., alligator.
r. John Heywood, Gardner, Mass., ten mallards.
r. J. J. Hoffman, Washington, D. C., alligator.
rs. Katherine Hunter, Washington, D. C., yellow-headed parrot.
rs. J. W Jenks, Washington, D. C., blue jay.
. Guy W. Latimer, Hyattsville, Md., ring-necked pheasant.
r. Willis Lillycrop, Washington, D. C., white-throated capuchin.
r. T. P. Lovering, Washington, D. C., two chicken snakes, a black snake, a
hern brown snake, and a brown water snake.
iss Eleanor Marshall, Washington, D. C., alligator.
r. D. W. May, Mayaguez, P. R., Mona Island iguana.
isses Margaret and Lily Meldahl, Washington. W. Va., curassow and a red-
w-and-blue macaw.
r. J. C. Meyer, Washington, D. C., fox sparrow.
r. Irvin Miller, second officer, steamship *Northland*, Norfolk, Va., green
n.
r. James Mooney, jr., Washington, D. C.. alligator.
iss Niles, Washington, D. C., alligator.
r. William H. Ottemiller, York, Pa., alligator.
rs. M. A. Pitt, Washington, D. C., three grass parrakeets.
r. T. J. Poole, Washington, D. C., two screech owls.
rs. J. L. Primm, Washington, D. C., three Virginia opossums.
r. Louis Rueger, Richmond, Va., Mexican puma.
r. W. E. Safford, Washington, D. C., gopher turtle.
r. E. S. Schmid, Washington, D. C., woodchuck.
r. R. W. Shufeldt, Washington, D. C., water snake.
iss Pearl Smith and Mr. J. C. Lamon, Alcoa, Tenn., two banded rattlesnakes.
r. John S. Stearns, Washington, D. C., horned grebe.
r. Wilfred Stevens, Wesley Heights, D. C., indigo bunting.
r. C. E. Swihart, Fort Barrancas, Fla., horned toad.
r. J. E. Taylor, Oxford, Md., common skunk.
r. Hall Vermillion, Washington, D. C., sparrow hawk.
r. Clark Vernon, Washington, D. C., alligator.
r. J. W. Weaver, Nashville, Tenn., common skunk.

Births.—Fifty-two mammals were born, and 41 birds were hatched
ring the year. The births include 3 bears, 1 hippopotamus, 8 red
er, 1 Bedford deer, 2 elk, 2 mule deer, 2 Virginia deer, 1 fallow deer,
xis deer, 2 hog deer, 4 barasingha deer, 3 Japanese deer, 1 black

buck, 1 yak, 3 bison, 1 Rocky Mountain sheep, 1 aoudad, 2 guanacos, 3 llamas, 2 great red kangaroos, 1 wallaroo, 6 coypus, and 1 monkey. The birds hatched include Canada geese, ducks, Java sparrows, and peafowl. The hippopotamus is the first one born in the park, and one of very few ever born in America. It is a thrifty male and has attracted great attention.

Exchanges.—In exchange for surplus animals the park received 12 mammals and 62 birds. A drill, a young male sea lion, a pair of scarlet ibises, and numerous ducks for the North American waterfowl lake were obtained in this manner, as well as other species much needed to fill gaps in the collection.

Purchases.—Owing to lack of sufficient funds for the purchase of animals, many desirable species greatly needed in the collection, and offered from time to time, could not be obtained. A total of 26 mammals, 23 birds, and 22 reptiles were received through purchase, mostly small native species at low cost.

Transfers.—Four elk were received from Yellowstone Park through the Department of the Interior, but only two reached Washington in good condition and were saved. These were shipped East with a carload of elk for the State of Virginia, and were obtained with the idea of introducing new blood in the herd maintained at the park. The Biological Survey, of the Department of Agriculture, transferred to the park certain North American mammals, including a mountain lion from Arizona, a dusky marmot from New Mexico, and some mountain beavers from Washington.

Captured in the park.—One bird and one reptile, captured within the boundaries of the park, were added to the collection.

Deposited.—Hon. R. M. Barnes, of Lacon, Ill., sent to the park as a loan a male of the almost extinct trumpeter swan, one of the finest species of North American waterfowl. The park owned a single female of this rare swan and efforts are now being made to mate these surviving birds and preserve the species from extinction. The two swans are quartered in an ideal place, and although they were apparently placed together too late to breed this season, hopes are entertained that by next spring they will be sufficiently familiar with their surroundings to nest. A number of fur-bearing animals from the Bureau of Biological Survey, Department of Agriculture, and some rhesus monkeys from the Hygienic Laboratory were received on temporary deposit.

REMOVALS.

Surplus birds and mammals to the number of 51 were exchanged to other zoological gardens, and 62 animals on deposit were returned to the Bureau of Biological Survey, Department of Agriculture, and to the Hygienic Laboratory. A number of specimens of native

cies were liberated in the Park and dropped from the list of ani-
ls in the collection.

The number of animals lost by death is comparatively small, but
ne important and valuable animals are included in the list. The
th of Dunk, the Indian elephant, was the most notable loss. Dunk
s the first animal to be placed in the Zoological Park when the
esent site was occupied. He was presented to the park by Mr.
mes E. Cooper, proprietor of the Adam Forepaugh Shows, April
, 1891, and was then about 25 years old. Over 50 years of age at
e time of his death, Dunk had reached the average limit for animals
his kind, for contrary to common belief the longevity of the ele-
ant is not great in proportion to the size of the beast. Others of
e more serious losses were a large Galapagos tortoise (*Testudo*
hippium), February 21, from enteritis; the harpy eagle (*Thrasaë-*
s harpyia) April 14, from aspergillosis; and a female Manchurian
ger which was mercifully killed as unfit for exhibition June 29.
he Galapagos tortoise, with others of his kind, had been in the col-
ction since October 1, 1898. The record for the harpy eagle is a
atter of pride for the keepers in the bird department, for this rare
rd of prey had been kept in good health for nearly 18 years. He
as received May 19, 1899, as a gift from the governor of the State
f Amazonas, Brazil, through Commander C. C. Todd, United States
avy. It is believed that the species has never before been kept in
ny gardens for a similar period.

Post-mortem examinations were made, as usual, by the pathological
ivision of the Bureau of Animal Industry, United States Depart-
ent of Agriculture. The following list shows the cause of death of
nimals in each general group. It is believed that the publication of
ch lists is to be encouraged, as they are of undoubted value to
ardens less fortunately provided for up-to-date pathological inves-
gations.

CAUSES OF DEATH.

MAMMALS.

imates: Gastritis, 1; enteritis, 3; gastroenteritis, 2; no cause found, 1.

rnivora: Enteritis, 3; gastroenteritis, 7; malnutrition, 1; anemia, 1; peri-
tonitis, 1; internal hemorrhage, 1.

gulates: Enteritis, 3; gastroenteritis, 1; pneumonia, 3; congestion of lungs,
1; tuberculosis, 2; uremia, 1; peritonitis, 1; necrosis of jaw, 1; cachexia, 1;
malnutrition, 1.

dents: Entertits, 1; gastroenteritis, 1; tuberculosis, 2; anemia, 1.

rsupials: Enteritis, 1; pneumonia, 1; septicemia, 1.

BIRDS.

sseriformes: Enteritis, 1.

raciiformes: Aspergillosis, 1; no cause found, 2.

Cuculiformes: Gastroenteritis, 1; internal hemorrhage, 1; cause not found, 10.[1]
Charadriiformes: Enteritis, 2; tuberculosis, 3; pneumonia, 2.
Gruiformes: Tuberculosis, 2.
Galliformes: Enteritis, 2; gastroenteritis, 2; quail disease, 22.
Falconiformes: Enteritis, 1; aspergillosis, 3; no cause found, 1.
Anseriformes: Enteritis, 2; tuberculosis, 4; pneumonia, 1; aspergillosis, 2; no cause found, 3.
Ciconiiformes: Enteritis, 5; anemia, 1; internal hemorrhage, 1; fibroma of intestine, 1.
Colymbiformes: Septicemia, 1.

REPTILES.

Testudinata: Enteritis, 1.
Loricata: No cause found, 1.
Serpentes: Enteritis, 1; intestinal necrosis, 1; no cause found, 1.

Thirty-three of the animals lost by death were transferred to the National Museum for mounting. These included all the rarer specimens or those of special scientific importance.

ANIMALS IN THE COLLECTION JUNE 30, 1917.

MAMMALS.

MARSUPIALIA.

Murine opossum (*Marmosa murina*)	1
Virginia opossum (*Didelphis virginiana*)	8
Tasmanian devil (*Sarcophilus harrisi*)	2
Phalanger (*Trichosurus vulpecula*)	2
Dusky phalanger (*Trichosurus fuliginosus*)	2
Nail-tailed wallaby (*Onychogale frenata*)	1
Brush-tailed rock kangaroo (*Petrogale penicillata*)	2
Great gray kangaroo (*Macropus giganteus*)	2
Red kangaroo (*Macropus rufus*)	5
Wallaroo (*Macropus robustus*)	8
Black-tailed wallaby (*Macropus ualabatus*)	1
Parma wallaby (*Macropus parma*)	1
Wombat (*Phascolomys mitchelli*)	2

CARNIVORA.

Kadiak bear (*Ursus middendorffi*)	1
Alaska Peninsula bear (*Ursus gyas*)	2
Yakutat bear (*Ursus dalli*)	1
Kidder's bear (*Ursus kidderi*)	2
Hybrid bear (*Ursus kidderi-arctos*)	3
European bear (*Ursus arctos*)	2
Himalayan bear (*Ursus thibetanus*)	1
Japanese bear (*Ursus japonicus*)	1
Grizzly bear (*Ursus horribilis*)	8
Black bear (*Ursus americanus*)	3
Kenai black bear (*Ursus americanus perniger*)	2

CARNIVORA—continued.

Cinnamon bear (*Ursus americanus cinnamomum*)	1
Sloth bear (*Melursus ursinus*)	1
Polar bear (*Thalarctos maritimus*)	2
Eskimo dog (*Canis familiaris*)	2
Gray wolf (*Canis nubilus*)	6
Southern wolf (*Canis floridanus*)	1
Woodhouse's wolf (*Canis frustror*)	2
Coyote (*Canis latrans*)	2
Red fox (*Vulpes fulva*)	7
Swift fox (*Vulpes velox*)	1
Gray fox (*Urocyon cinereoargenteus*)	1
Cacomistle (*Bassariscus astutus*)	1
Raccoon (*Procyon lotor*)	8
Gray coatimundi (*Nasua narica*)	1
Kinkajou (*Potos flavus*)	1
Ferret (*Mustela furo*)	1
Mink (*Mustela vison*)	1
Tayra (*Tayra barbara*)	1
Skunk (*Mephitis nigra*)	2
American badger (*Taxidea taxus*)	2
European badger (*Meles meles*)	2
Florida otter (*Lutra canadensis vaga*)	5
African civet (*Viverra civetta*)	1
Genet (*Genetta genetta*)	1
Spotted hyena (*Crocuta crocuta*)	1
African cheetah (*Acinonyx jubatus*)	2
Lion (*Felis leo*)	4
Somaliland lion (*Felis leo somaliensis*)	1
Bengal tiger (*Felis tigris*)	2
Manchurian tiger (*Felis tigris longipilis*)	1
Leopard (*Felis pardus*)	2
East African leopard (*Felis pardus suahelica*)	1

---

[1] Nine lorikeets, while apparently healthy, died suddenly after convulsions. The pathologists have thus far been unable to find the cause.

CARNIVORA—continued.

elis onca)	1
puma (*Felis azteca*)	2
lion (*Felis hippolestes*)	4
ynx (*Lynx canadensis*)	3
(*Lynx ruffus*)	6
lynx (*Lynx californicus*)	1

PINNIPEDIA.

sea lion (*Zalophus califor-*	2
ea lion (*Eumetopias jubata*)	1
eal (*Phoca vitulina*)	2

RODENTIA.

n cavy (*Dolichotis patagon-*	2
guinea pig (*Cavia tschudii r*)	8
g (*Cavia porcellus*)	20
yocastor coypus)	7
gouti (*Dasyprocta mexicana*)	1
gouti (*Dasyprocta azaræ*)	2
gouti (*Dasyprocta cristata*)	4
niculus paca)	2
(*Lagostomus maximus*)	1
orcupine (*Hystrix cristata*)	1
beaver (*Aplodontia rufa*)	2
k (*Marmota monax*)	1
armot (*Marmota flaviventris*)	1
og (*Cynomys ludovicianus*)	2
permophile (*Citellus tridecem-* *s*)	1
uirrel (*Sciurus carolinensis*)	1
beaver (*Castor canadensis*)	2

LAGOMORPHA.

rabbit (*Oryctolagus cunicu-*	15

EDENTATA.

nadillo (*Euphractus villosus*)	2

PRIMATES.

lemur (*Lemur mongoz*)	1
ur (*Lemur macaco*)	1
ey (*Saimiri sciureus*)	2
ler monkey (*Ateles geoffroyi*)	1
oated capuchin (*Cebus ca-* *s*)	2
puchin (*Cebus fatuellus*)	1
aboon (*Papio papio*)	3
Papio porcarius)	1
boon (*Papio cynocephalus*)	1
as baboon (*Papio hamadryas*)	2
(*Papio sphinx*)	1
pio leucophæus)	1
aque (*Cynopithecus maurus*)	1
acaque (*Macaca speciosa*)	2
monkey (*Macaca fuscata*)	2
monkey (*Macaca nemes-*	2

PRIMATES—continued.

Rhesus monkey (*Macaca rhesus*)	28
Bonnet monkey (*Macaca sinica*)	2
Javan macaque (*Macaca mordax*)	1
Sooty mangabey (*Cercocebus fuliginosus*)	2
Green guenon (*Lasiopyga callitrichus*)	1
Vervet guenon (*Lasiopyga pygerythra*)	2
Mona (*Lasiopyga mona*)	3
Roloway guenon (*Lasiopyga roloway*)	1
Patas monkey (*Erythrocebus patas*)	3
Chimpanzee (*Pan troglodytes*)	1

ARTIODACTYLA.

Collared peccary (*Pecari angulatus*)	1
Wild boar (*Sus scrofa*)	1
Wart hog (*Phacochœrus æthiopicus*)	2
Hippopotamus (*Hippopotamus amphibius*)	3
Bactrian camel (*Camelus bactrianus*)	3
Arabian camel (*Camelus dromedarius*)	3
Guanaco (*Lama huanachus*)	5
Llama (*Lama glama*)	8
Alpaca (*Lama pacos*)	2
Vicuna (*Lama vicugna*)	1
Fallow deer (*Dama dama*)	7
Axis deer (*Axis axis*)	6
Hog deer (*Hyelaphus porcinus*)	7
Sambar (*Rusa unicolor*)	2
Luzon deer (*Rusa philippinus*)	1
Barasingha (*Rucervus duvaucelii*)	13
Japanese deer (*Sika nippon*)	9
Red deer (*Cervus elaphus*)	15
Kashmir deer (*Cervus hanglu*)	5
Bedford deer (*Cervus xanthopygus*)	5
American elk (*Cervus canadensis*)	9
Virginia deer (*Odocoileus virginianus*)	12
Mule deer (*Odocoileus hemionus*)	4
Black-tailed deer (*Odocoileus columbianus*)	3
Blesbok (*Damaliscus albifrons*)	1
White-tailed gnu (*Connochætes gnu*)	1
Defassa water-buck (*Kobus defassa*)	1
Indian antelope (*Antilope cervicapra*)	5
Springbok (*Antidorcas marsupialis centralis*)	1
Sable antelope (*Ozanna niger*)	1
Nilgai (*Boselaphus tragocamelus*)	2
Congo harnessed antelope (*Tragelaphus gratus*)	2
East African eland (*Taurotragus oryx livingstonii*)	3
Tahr (*Hemitragus jemlahicus*)	4
Aoudad (*Ammotragus lervia*)	9
Circassian goat (*Capra hircus*)	2
Rocky Mountain sheep (*Ovis canadensis*)	6
Barbados sheep (*Ovis aries*)	8
Zebu (*Bos indicus*)	2
Anoa (*Anoa depressicornis*)	1
Yak (*Poëphagus grunniens*)	4
American bison (*Bison bison*)	18

PERISSODACTYLA.

Brazilian tapir (*Tapirus terrestris*)	4
Mongolian horse (*Equus przewalskii*)	1
Grant's zebra (*Equus burchelli granti*)	1
Grevy's zebra (*Equus grevyi*)	2
Zebra horse, hybrid (*Equus grevyi-caballus*)	1

PERISSODACTYLA—continued.

Zebra ass, hybrid (*Equus grevyi-asinus*)	1

PROBOSCIDEA.

Abyssinian elephant (*Loxodonta africana oxyotis*)	1

BIRDS.

RATITÆ.

South African ostrich (*Struthio australis*)	4
Somaliland ostrich (*Struthio molybdophanes*)	1
Rhea (*Rhea americana*)	2
Cassowary (*Casuarius galeatus*)	1
Emu (*Dromiceius novæhollandiæ*)	2

CICONIIFORMES.

American white pelican (*Pelecanus erythrorhynchos*)	9
European white pelican (*Pelecanus onocrotalus*)	2
Roseate pelican (*Pelecanus roseus*)	2
Australian pelican (*Pelecanus conspicillatus*)	2
Brown pelican (*Pelecanus occidentalis*)	8
Florida cormorant (*Phalacrocorax auritus floridanus*)	16
White-necked heron (*Ardea cocoi*)	1
Great blue heron (*Ardea herodias*)	1
Snowy egret (*Egretta candidissima*)	8
Green heron (*Butorides virescens*)	1
Black-crowned night heron (*Nycticorax nycticorax nævius*)	14
Boatbill (*Cochlearius cochlearius*)	2
White stork (*Ciconia ciconia*)	8
Black stork (*Ciconia nigra*)	1
Marabou stork (*Leptoptilos dubius*)	1
Sacred ibis (*Threskiornis æthiopicus*)	8
White ibis (*Guara alba*)	11
Scarlet ibis (*Guara rubra*)	2
Roseate spoonbill (*Ajaia ajaja*)	2
European flamingo (*Phœnicopterus roseus*)	1

ANSERIFORMES.

Black-necked screamer (*Chauna torquata*)	8
Horned screamer (*Anhima cornuta*)	1
Mallard (*Anas platyrhynchos*)	10
East Indian black duck (*Anas platyrhynchos var.*)	14
Black duck (*Anas rubripes*)	1
European widgeon (*Mareca penelope*)	1
Baldpate (*Mareca americana*)	9
Green-winged teal (*Nettion carolinense*)	11
Blue-winged teal (*Querquedula discors*)	8
Ruddy sheldrake (*Casarca ferruginea*)	1

ANSERIFORMES—continued.

Pintail (*Dafila acuta*)	8
Wood duck (*Aix sponsa*)	9
Mandarin duck (*Dendronessa galericulata*)	26
Canvas-back (*Marila valisineria*)	1
Lesser scaup duck (*Marila affinis*)	6
Rosy-billed pochard (*Metopiana peposaca*)	1
Snow goose (*Chen hyperboreus*)	3
Blue goose (*Chen cærulescens*)	2
Ross's goose (*Chen rossii*)	1
White-fronted goose (*Anser albifrons*)	4
American white-fronted goose (*Anser albifrons gambeli*)	1
Toulouse goose (*Anser cinereus domesticus*)	2
Bar-headed goose (*Anser indicus*)	2
Canada goose (*Branta canadensis*)	23
Hutchins's goose (*Branta canadensis hutchinsii*)	4
Cackling goose (*Branta canadensis minima*)	2
Barnacle goose (*Branta leucopsis*)	2
Upland goose (*Chloëphaga leucoptera*)	1
Spur-winged goose (*Plectropterus gambensis*	1
Cape Barren goose (*Cereopsis novæhollandiæ*)	2
Wandering tree duck (*Dendrocygna arcuata*)	2
White-faced tree duck (*Dendrocygna viduata*)	3
Black-bellied tree duck (*Dendrocygna autumnalis*)	1
Mute swan (*Cygnus gibbus*)	4
Whistling swan (*Olor columbianus*)	4
Trumpeter swan (*Olor buccinator*)	2
Black swan (*Chenopsis atrata*)	3

FALCONIFORMES.

South American condor (*Vultur gryphus*)	1
California condor (*Gymnogyps californianus*)	3
Turkey vulture (*Cathartes aura*)	4
Black vulture (*Coragyps urubu*)	2
King vulture (*Sarcoramphus papa*)	2
Secretary bird (*Sagittarius serpentarius*)	1
Griffon vulture (*Gyps fulvus*)	2
Cinereous vulture (*Aegypius monachus*)	2

FALCONIFORMES—continued.

rgeyer (*Gypaëtus barbatus*)	1
ra (*Polyborus cheriway*)	3
-throated caracara (*Ibycter*	1
d hawk eagle (*Spizaëtus coro-* s)	1
tailed eagle (*Uroaëtus audax*)	2
eagle (*Aquila chrysaëtos*)	2
agle (*Haliæetus leucocephalus*)	15
n bald eagle (*Haliæetus leuco-* *ilus alascanus*)	1
w hawk (*Falco sparverius*)	3

GALLIFORMES.

n curassow (*Crax globicera*)	2
ton's curassow (*Crax dauben-*	3
urkey (*Meleagris gallopavo*)	5
l (*Pavo cristatus*)	35
k pheasant (*Polyplectron bicalcarum*)	1
pheasant (*Euplocamus nycthe-* *s*)	1
francolin (*Francolinus natalen-*	1
francolin (*Francolinus seph-*	1
crested quail (*Eupsychortyx* *atus*)	2
te (*Colinus virginianus*)	5
quail (*Callipepla squamata*)	2
's quail (*Lophortyx gambelii*)	1
quail (*Lophortyx californica* *cola*)	1

GRUIFORMES.

an coot (*Fulica americana*)	22
ing crane (*Grus americana*)	1
ll crane (*Grus mexicana*)	3
necked crane (*Grus leucauchen*)	1
white crane (*Grus leucogera-*	1
's crane (*Grus lilfordi*)	3
lian crane (*Grus rubicunda*)	1
elle crane (*Anthropoides virgo*)	7
d crane (*Balearica pavonina*)	2
a (*Cariama cristata*)	1

CHARADRIIFORMES.

black-backed gull (*Larus mari-*	1
g gull (*Larus argentatus*)	1
ng gull (*Larus atricilla*)	2
lian crested pigeon (*Ocyphaps* *otes*)	14
-wonga pigeon (*Leucosarcia* *ta*)	10
d pigeon (*Columba phæonota*)	1
pigeon (*Columba leuconota*)	2
rowned pigeon (*Patagiœnas* *cephala*)	1
ailed pigeon (*Chlorœnas fas-* *i*)	4

CHARADRIIFORMES—continued.

Red-billed pigeon (*Chlorœnas flavirostris*)	4
White-winged dove (*Melopelia asiatica*)	1
Mourning dove (*Zenaidura macroura*)	10
Peaceful dove (*Geopelia tranquilla*)	2
Zebra dove (*Geopelia striata*)	19
Cape masked dove (*Œna capensis*)	3
Inca dove (*Scardafella inca*)	3
Blue-headed quail-dove (*Starnœnas cyanocephala*)	2
Collared turtle-dove (*Streptopelia risoria*)	20

CUCULIFORMES.

White-crested touraco (*Turacus corythaix*)	1
Grass parrakeet (*Melopsittacus undulatus*)	3
Black-tailed parrakeet (*Polytelis melanura*)	1
Banded parrakeet (*Palæornis fasciata*)	1
Lesser vasa parrot (*Coracopsis nigra*)	1
Gray parrot (*Psittacus erithacus*)	1
Cuban parrot (*Amazona leucocephala*)	1
Porto Rican parrot (*Amazona vittata*)	1
Yellow-winged parrot (*Amazona barbadensis*)	2
Festive parrot (*Amazona festiva*)	1
Yellow-fronted parrot (*Amazona ochrocephala*)	2
Yellow-naped parrot (*Amazona auropalliata*)	2
Yellow-headed parrot (*Amazona oratrix*)	4
Quaker parrot (*Myiopsitta monachus*)	1
Red-and-blue macaw (*Ara chloroptera*)	2
Red-and-yellow-and-blue macaw (*Ara macao*)	7
Yellow-and-blue macaw (*Ara ararauna*)	1
Sulphur-crested cockatoo (*Cacatoes galerita*)	3
Great red-crested cockatoo (*Cacatoes moluccensis*)	1
White cockatoo (*Cacatoes alba*)	3
Leadbeater's cockatoo (*Cacatoes leadbeateri*)	1
Bare-eyed cockatoo (*Cacatoes gymnopis*)	3
Roseate cockatoo (*Cacatoes roseicapilla*)	12
Scaly-breasted lorikeet (*Psitteuteles chlorolepidotus*)	1

CORACIIFORMES.

Giant kingfisher (*Dacelo gigas*)	2
Concave-casqued hornbill (*Dichoceros bicornis*)	1
Barred owl (*Strix varia*)	5
Screech owl (*Otus asio*)	1
Great horned owl (*Bubo virginianus*)	14

PASSERIFORMES.

Yellow tyrant (*Pitangus sulphuratus*)	1
Japanese robin (*Liothrix luteus*)	4
Laughing thrush (*Garrulax leucolophus*)	2
Mockingbird (*Mimus polyglottos*)	1
Brown thrasher (*Toxostoma rufum*)	1
Australian gray jumper (*Struthidea cinerea*)	1
Red-billed magpie (*Urocissa occipitalis*)	1
American magpie (*Pica pica hudsonica*)	8
Blue jay (*Cyanocitta cristata*)	2
American crow (*Corvus brachyrhynchos*)	1
Australian crow (*Corvus coronoides*)	1
European raven (*Corvus corax*)	1
Glossy starling (*Lamprotornis caudatus*)	1
Malabar starling (*Spodiopsar malabaricus*)	1
Napolean weaver (*Pyromelana afra*)	2

PASSERIFORMES—continued.

Crimson-crowned weaver (*Pyromelana flammiceps*)	
Madagascar weaver (*Foudia madagascariensis*)	
Paradise weaver (*Steganura paradisea*)	
Cut-throat finch (*Amadina fasciata*)	
Black-faced Gouldian finch (*Poephila gouldiæ*)	
Black-headed finch (*Munia atricapilla*)	
Three-colored finch (*Munia malacca*)	
Nutmeg finch (*Munia punctularia*)	
Java sparrow (*Munia oryzivora*)	
White Java sparrow (*Munia oryzivora*)	
Cowbird (*Molothrus ater*)	
Fox sparrow (*Passerella iliaca*)	
Nonpareil (*Passerina ciris*)	
Saffron finch (*Sicalis flaveola*)	
Canary (*Serinus canarius*)	
Green singing finch (*Serinus icterus*)	
Red-crested cardinal (*Paroaria cucullata*)	
Cardinal (*Cardinalis cardinalis*)	

REPTILES.

Gopher tortoise (*Gopherus polyphemus*)	1
Duncan Island tortoise (*Testudo ephippium*)	1
Albemarle Island tortoise (*Testudo vicina*)	1
Alligator (*Alligator mississippiensis*)	80
Mona Island iguana (*Cyclura stejnegeri*)	1
Gila monster (*Heloderma suspectum*)	7
Horned toad (*Phrynosoma cornutum*)	
Rock python (*Python molurus*)	
Anaconda (*Eunectes murinus*)	
Boa constrictor (*Constrictor constrictor*)	
Water snake (*Natrix sipedon*)	
Black snake (*Coluber constrictor*)	
Coach-whip snake (*Coluber flagellum*)	
Chicken snake (*Elaphe obsoleta quadrivittata*)	

STATEMENT OF THE COLLECTION.

ACCESSIONS DURING THE YEAR.

Presented:		
Mammals	28	
Birds	44	
Reptiles	27	
		99
Born and hatched in the National Zoological Park:		
Mammals	52	
Birds	41	
		93
Received in exchange:		
Mammals	12	
Birds	62	
		74
Purchased:		
Mammals	26	
Birds	23	
Reptiles	22	
		71
Transferred from other Government departments:		
Mammals	[illegible]	
Captured in National Zoological Park:		
Birds	1	
Reptiles	1	
Deposited:		
Mammals	[illegible]	
Birds	1	
Total accessions		

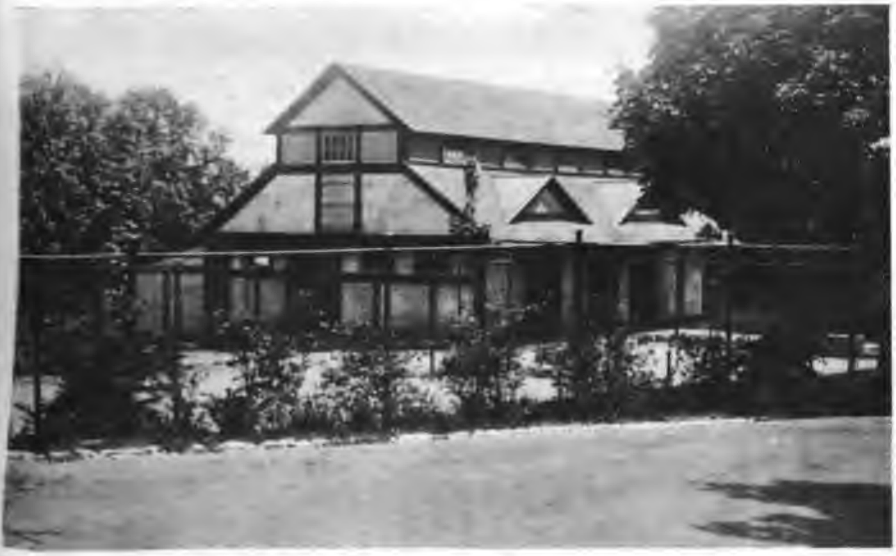

FIG. 1.—THE RECONSTRUCTED BUFFALO HOUSE, NOW USED AS A SHELTER FOR THE MOUNTAIN SHEEP, ELANDS, AND KASHMIR DEER, RECENT GIFTS TO THE PARK FROM CANADA AND ENGLAND.

FIG. 2.—VIEW ON THE NEW NORTH AMERICAN WATERFOWL LAKE IN THE NATIONAL ZOOLOGICAL PARK. TWENTY-FOUR OF OUR NATIVE SPECIES OF WILD DUCKS AND GEESE MAY BE SEEN ON THIS LAKE.

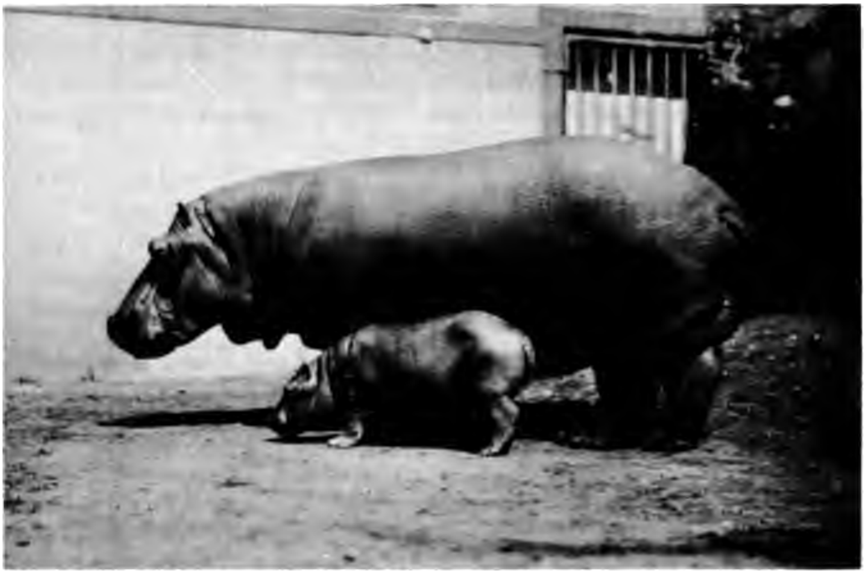

FIG. 1.—HIPPOPOTAMUS AND YOUNG (BORN IN NATIONAL ZOOLOGICAL PARK, MAY 23, 1917).

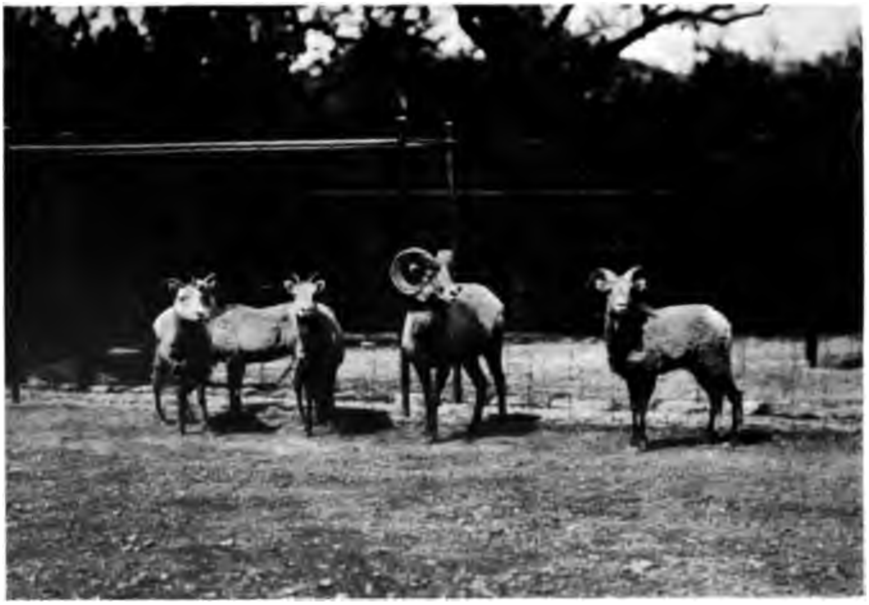

FIG. 2.—ROCKY MOUNTAIN SHEEP RECEIVED AT THE NATIONAL ZOOLOGICAL PARK, MARCH 7, 1917, FROM ROCKY MOUNTAINS PARK, BANFF, ALBERTA, CANADA.

SUMMARY.

ls on hand July 1, 1916	1,383
ions during the year	397
	1,780
: loss (by exchange, death, return of animals, and animals lib-ed)	557
On hand June 30, 1917	1,223

Class.	Species.	Individuals.
s	159	484
	182	683
	14	56
tal	355	1,223

VISITORS.

e number of visitors to the park during the year, as determined unt and estimate, was 1,106,800, a daily average of 3,032. The est number in any one month was 171,400, in April, 1917, an ge per day of 5,713. The attendance by months was as fol-

: July, 78,800; August, 80,500; September, 122,550; October, 92,200; ıber, 43,250; December, 44,625.

': January, 37,750; February, 55,675; March, 108,400; April, 171,400; 110,550; June, 161,100.

cepting 1916, this was the largest attendance in the history of ark. The number of visitors was only 50,310 less than in 1916, oubtless would have exceeded that record year but for the un-able weather on Easter Monday.

hundred and fifty-three schools and classes visited the park, a total of 8,492 individuals. In addition to the local schools hose from near-by States, these included schools from Alabama, nsas, Massachusetts, New Jersey, New York, Ohio, Oklahoma, ylvania, and Vermont. A number of officials from other zoo-l gardens visited the park.

exceptionally favorable weather made the skating pond an tive feature during the past winter and for a much longer l than usual. The ice was kept clean of snow throughout the and the appreciation of the public would seem to warrant the uction of additional lakes to be used for exhibits of waterfowl g the summer and skating in winter.

IMPROVEMENTS.

The hospital and laboratory, which has been mentioned in the reports for the last two years, is still unfinished, but a considerable amount of work was done on the interior cages so that the building now lacks only the necessary outside yards and the laboratory equipment. The hospital cages are designed for the care and special comfort of indisposed or quarantined animals, and accommodations are provided for two mammals of lion-size, three of leopard-size, three large ruminants, and a number of smaller animals. In addition, there is a large, well lighted, central room for laboratory use. The completion of this building will greatly facilitate the work of the pathologists from the Department of Agriculture who visit the park.

The largest water fowl lake, in the southeastern part of the park, was enlarged and reconstructed to provide safe and retired breeding and resting places for the birds. It had formerly been inclosed by a fence of ordinary poultry wire without special protection from predacious animals, and there had been frequent loss from the depredations of rats and the smaller native carnivores. In order to increase sufficiently the land area it was necessary to construct a stone wall along Rock Creek at the rear of the inclosure. By lowering the grade of the hill bordering the lake, sufficient earth was procured to fill up to the level of the wall on the inner side. A rat-proof fence was woven in the machine shop and further provided with guards against cats and raccoons. The level of the water was raised about 12 inches, greatly increasing the size of the lake, and the new fence was constructed on a concrete coping considerably outside the former boundary. Numerous shrubs, small trees, canes, and grasses were planted to supplement the fine growth of larger trees already on the area. Visitors walk along one side of the lake only and as the thick vegetation virtually hides the fence on the opposite side at all points the effect is that of a wilderness breeding lake for ducks and geese. As completed, the inclosure provides almost natural conditions for the waterfowl of numerous species and forms a very attractive exhibit. It has been given over entirely to North American species and it is hoped that a large representation of the ducks, geese, and other aquatic birds commonly associated with them native to our continent may be kept here. On June 30, no less than 136 North American waterfowl, of 24 species, were to be seen on the lake. The natural surroundings and the fact that only American species are shown here makes this waterfowl lake of special interest to school classes, sportsmen, and bird lovers, and it has become one of the popular features of the park. A cement walk was extended from the bridge near the Harvard Street entrance along the south side of the road to the cross roads, to connect with the cinder path bordering the lake.

The work of grading and filling around the old buffalo house and the remodeling of the building for other uses, which was commenced last year, has been completed. As reconstructed the building makes an ideal shelter of pleasing design and furnishes house space for the animals occupying the six large paddocks that surround it. The Canadian Rocky Mountain sheep, the elands, and the Kashmir deer are provided for in this group of yards.

An outdoor cage and shelter, summer quarters for the chimpanzee, were built near the north entrance to the lion house. This provides not only for the better health of this interesting trained ape, but makes it possible for larger crowds to gather about at the time his meals are served.

New paddocks were provided for ungulate mammals on the piece of ground recently leveled by grading northwest of the llama yards. Much-needed repairs were made on the wolf dens and to the lion-house roof.

A considerable portion of the pasture land near the office was plowed as an addition to the garden, in an effort to decrease the cost of feed for the animals. For the same reason horseflesh has been substituted for beef as food for the carnivorous animals, with the prospect of saving at least $6,000 on this item alone during the next fiscal year. A portion of the nursery was fenced and breeding pens for quail and other game birds were installed within the inclosure. It is hoped that most of the quail of various species needed for park purposes may be reared in this place and that important experiments in the breeding of game birds may at the same time be conducted without additional expense.

THE PARK AS A BIRD SANCTUARY.

The entire 169 acres of the National Zoological Park constitutes a carefully preserved sanctuary for native wild birds. Every effort is being made to increase the bird population within this area and to give better protection to the resident species. During the past year over 100 nesting boxes were provided for those species which commonly nest in holes in trees. These were made in the carpenter shop at odd times during the winter months from trunks and limbs of fallen trees with the bark in place. Attached to trees of the same kind or with bark of the same color these nesting boxes are much less conspicuous and unsightly in the park trees than square boxes made from planed boards. Many of the boxes were occupied during the summer by bluebirds, chickadees, nuthatches, wrens, and flickers, and additional nests will be provided from year to year. During the colder months food is provided for the winter residents in various parts of the park.

Of all the native wild birds within the park perhaps none attract so much attention as the turkey vultures, or "buzzards," which congregate here in great numbers during the fall and winter months. Food, at practically no expense, is provided for the vultures, and they become very tame and confiding. Many visitors from the Northern States, to whom the birds are a novel sight, greatly admire the graceful flight of these interesting creatures. During the summer months the vultures scatter out over the surrounding country, to nest, and only a few appear within the boundaries of the park, but the security afforded for winter roosts brings them back in great numbers with the approach of autumn.

Bobwhite quail appear to be increasing in numbers within the park and are now fairly abundant. A considerable number of these birds must help stock the surrounding country from year to year.

Numerous bird classes from the schools and parties of Audubon Society members find the wilder parts of the park ideal grounds for observation of the birds.

ALTERATION OF WESTERN BOUNDARY.

It again appears desirable to recapitulate for future reference the various stages through which the matter of the adjustment of the western boundary, near the Connecticut Avenue entrance, has passed.

The following appropriation was made by the act approved June 23, 1913:

> Readjustment of boundaries: For acquiring, by condemnation, all the lots, pieces, or parcels of land, other than the one hereinafter excepted, that lie between the present western boundary of the National Zoological Park and Connecticut Avenue from Cathedral Avenue to Klingle Road, $107,200, or such portion thereof as may be necessary, said land when acquired, together with the included highways, to be added to and become a part of the National Zoological Park. The proceedings for the condemnation of said land shall be instituted by the Secretary of the Treasury under and in accordance with the terms and provisions of subchapter 1 of chapter 15 of the Code of Law for the District of Columbia.

As the act required that the proceedings be instituted by the Secretary of the Treasury, the attention of that official was called to the matter in a letter from the Secretary of the Smithsonian Institution, dated June 28, 1913. A special survey and plat of the land required was necessary, but this plat was not forwarded to the Department of Justice until November 5, 1913. Other delays ensued; the title of the various owners of the land had to be investigated, and it was not until March 11, 1914, that the district court ordered a jury to be summoned. A hearing was set for April 10, 1914, and a final hearing of the case was heard by the jury on July 2 following. The verdict of the jury was not filed until December 11, 1914. The hearing of objections to the verdict much delayed a final conclusion, especially as the time of the court was almost wholly occupied by a contest in an important will case. It was not until June 28, 1915, over two years from the passage of the appropriation act, that the court confirmed the verdict as regards the awards for damages for the land to be taken. The benefits assessed against the neighboring property were set aside by this and by a subsequent decision of January 28, 1916. The decree of the court fixed the amount required for the purchase of the land at $194,438.08. The cost of the proceedings for condemnation was $2,203.35.

The great delay caused by these legal proceedings occasioned another complication. The appropriation made by the act of June 23, 1913, was not a continuing one, but lapsed at the end of one year. Consequently after June 30, 1915, there was nothing available to defray the purchase of the land.

An item for an additional appropriation and for a reappropriation of the original sum appropriated by the act of June 23, 1913, was submitted to the first and second sessions of the Sixty-fourth Congress, but was not favorably considered.

It is greatly to be regretted that this appropriation failed, as it is exceedingly desirable that the land in question be obtained for park purposes before it is too late. A frontage on Connecticut Avenue at this point is most important, because the principal entrance to the park will probably be here for all time, and it is essential that the control of the land be in the hands of park authorities.

IMPORTANT NEEDS.

Grading and filling.—The work of grading and filling, commenced last year, should be continued. The further cutting away of the irregular hill in the center of the western part of the park and the filling in of a nearby ravine will level nearly 70,000 square feet of ground which is now of little use and make available about 25,000 square feet of ground at the ravine, besides straightening out the automobile road at this point. More inclosures are seriously needed for deer and similar animals, and this grading would provide for a number of these yards on flat ground.

Public-comfort building and restaurant.—The need of a suitable structure for a rest house and refreshment room is strongly felt. This rest house should provide toilet facilities for both women and men. It is probably true that the present restaurant occasions more unfavorable comment from visitors than any other one feature in the park. It is only a rude wooden platform with cover, but with open sides; the kitchen and other facilities are inadequate, and the entire structure is in a bad state of repair.

Roads, bridle paths, and automobile parking.—The question of providing space for the parking of automobiles near the main buildings in the center of the park is becoming serious. The available space is entirely insufficient on nearly every Sunday and on all holidays. In order to provide suitable accommodations for the constantly increasing number of cars it will be necessary to make some change in the roads and lawns at the central point. It will be necessary to make extensive repairs to the roads during the coming year, which will involve a considerable expenditure. The roads need repair now, but under the stringent economy that is compelled during 1918 it will not be possible to make even the repairs already needed, nor to provide proper upkeep of the roads. The greatly increased auto traffic (sometimes 2,500 cars in a day) makes necessary each year greater expenditures to keep the roads in order. Some change should be made in the bridle paths in order that equestrians would not be forced to use the bridge and the main road from the Harvard Street gate to the crossroads. Numerous complaints have been made as to the danger at these points, not only to children, but to the riders themselves. The bridle path could, at some expense, be carried up the west side of the creek from the crossroads, and a ford constructed to connect with the bridle path on the east side of the creek.

Outdoor dens for carnivorous mammals.—Recent experiments have shown that many kinds of animals usually kept in heated houses are much better off in outdoor yards, with warm, but unheated sleeping quarters. Such accommodations should be provided for the Siberian tiger, some of the lions, and other animals now occupying quarters in crowded heated houses. The health of these animals would unquestionably be improved and their lives prolonged under such conditions, and the space they now occupy in heated houses would become available for other animals really needing such accommodations. A series of outdoor, unheated cages and shelters should also be provided to replace the series of unsightly old wooden cages along the hilltop north of the bird house.

Additional ponds for waterfowl.—Additional lakes to be used for waterfowl in summer and for skating in winter could be provided at comparatively small expense both in the open flat near the Harvard Street entrance and near the pelican pond across the road. Exhibits of waterfowl are very popular and instructive, and the skating privilege is much appreciated by the public in winter.

Aviary building.—The park reports have for a number of years urged the appropriation of funds for a new bird house. That such a structure is badly needed is apparent. The building now used for the birds was erected in the cheapest manner possible for temporary use and is now in a bad state of repair. The collection is an important one, and a suitable bird house would without doubt prove one of the most attractive and instructive features of the park.

Reptile house.—A properly constructed reptile house would, it is certain, prove almost as attractive to the public as a bird house. The comparatively small collection of reptiles now kept in crowded quarters in the lion house is very popular.

The most urgent need of the park is a substantial increase in the general appropriation. When the amount provided was raised to the present figure, seven years ago, it was recognized that there was necessity for a considerable sum above the cost of actual maintenance, in order that improvements could be made and the grounds and buildings be kept in a good state of repair. Owing to the steady advance in the price of supplies and to the additional expense necessitated by the constantly increasing number of visitors, the point has now been reached where the entire appropriation does not cover actual maintenance expenses. It is only by rigid economy, and by the elimination of some things really necessary, that the cost of operation can be kept within the amount.

Respectfully submitted.

N. Hollister,
Superintendent.

Dr. Charles D. Walcott,
Secretary of the Smithsonian Institution.

APPENDIX 5.

REPORT OF THE ASTROPHYSICAL OBSERVATORY.

SIR: I have the honor to present the following report on the operations of the Smithsonian Astrophysical Observatory for the year ending June 30, 1917.

EQUIPMENT.

The equipment of the observatory is as follows:

(*a*) At Washington there is an inclosure of about 16,000 square feet, containing five small frame buildings used for observing and computing purposes, three movable frame shelters covering several out-of-door pieces of apparatus, and also one small brick building containing a storage battery and electrical distribution apparatus.

(*b*) At Mount Wilson, Cal., upon a leased plat of ground 100 feet square, in horizontal projection, are located a one-story cement observing structure, designed especially for solar-constant measurements, and also a little frame cottage, 21 feet by 25 feet, for observer's quarters. Upon the observing shelter at Mount Wilson there is a tower 40 feet high above the 12-foot piers which had been prepared in the original construction of the building. This tower is equipped with a tower telescope for use when observing (with the spectrobolometer) the distribution of radiation over the sun's disk.

During the year apparatus for research has been purchased or constructed at the observatory shop. The value of these additions to the instrumental equipment is estimated at $1,000.

WORK OF THE YEAR.

1. AT WASHINGTON.

Three copies of the pyranometer, our new instrument for measuring sky radiation, have been prepared by the Institution, respectively, for the United States Weather Bureau, the University of Wisconsin, and for the proposed expedition to South America mentioned in my report for 1916. These instruments were finished and standardized by Mr. Aldrich. The tests made led to long investigations and improvements, which greatly increased the sensitiveness of the pyrano-

. All three instruments are now in use and, so far as known, ;atisfaction.

o silver-disk pyrheliometers were standardized for the proposed American expedition.

ısiderable work was done on the apparatus mentioned last year, ıed to measure the constant of the fourth power radiation ıla. Owing to trouble found in maintaining a vacuum in the ·atus no actual determinations were made.

ch attention was devoted to the preparation of the equipment ;olar constant expedition for South America. The purpose of xpedition, as stated last year, is by cooperation with Mount n to secure daily values as far as possible throughout the year veral years, and thus to investigate the influence of solar vari- on terrestrial temperature.

Fig. 1.—Computing machine in use in North Carolina.

improved devices were in- d and constructed for the ex- ion. Among them is a new ım bolometer of very high sen- ness and in every way exem- behavior. This instrument is ructed in such a way as to be l off when highly exhausted, ın X-ray tube. Having no or windows it requires no er attention to maintain a m indefinitely. The construc- of the sensitive strips follows ndications of mathematical sis covering the whole theory e bolometer, so that a maxi- sensitiveness is obtained. A ır instrument was prepared 'or Mount Wilson work. The high sensitiveness of the new .eter is indicated by the statement that when used with the same ·oscope and galvanometer employed in our Algerian expedition 12 more than tenfold deflections on the solar spectrum were ·ed with similar conditions.

other new instrument is a special machine designed to aid in ing spectro-bolometry, in solar constant work. Heretofore we plotted, on large cross-section paper, logarithms of observed tion against the air-masses traversed by the solar beam. Nearly such plots, each of six points, are required to represent a ing's spectro-bolometry. The plotted points fall in approxi- y straight lines, whose projection to the zero of air mass yields logarithms of intensities as they would be observed outside our atmosphere. The inclinations of the representative straight lines give the logarithms of the atmospheric transmission coefficients. What I desire to point out is that the process requires taking out about 300 logarithms, besides plotting and extrapolating.

In the new instrument as shown in the illustration six 16-inch slide rules are arranged to be set at chosen places and at right angles to a horizontal linear scale of air masses. The observations are set up by reading the crossline of the sliders against the central movable slide-rule scales, these latter being set with respect to the fixed scales on the sides so as to apply a small correction for sensitiveness of the bolometric apparatus. A stretched wire is then adjusted to fit the six points as thus plotted. On another slide rule fixed at zero air mass one reading of the crossing point of the wire over the fixed scale gives the intensity as it would be outside the atmosphere, and a second reading on the movable scale gives the atmospheric transmission coefficient. No logarithms or computing are required.

The equipment of the expedition was all boxed ready for shipment to South America when circumstances connected with the war with Germany led to a postponement. Under these circumstances it was deemed best to send the expedition to Hump Mountain in North Carolina, a station at 4,800 feet elevation, where it is now located. This location was chosen with a view to its being at a great distance from Mount Wilson, in a region where Weather Bureau observers reported uncommonly little cloudiness, and easily accessible from the railroad and from Washington.

The expedition with over 3 tons of equipment went forward in May, 1917. It is in charge of Mr. A. F. Moore, who is assisted by Mr. L. H. Abbot. Two small frame buildings were erected for the observing and living quarters. The apparatus was set up and adjusted by Messrs. C. G. Abbot, L. B. Aldrich, and A. F. Moore, and gotten ready for observing about June 15. Unfortunately the most cloudy and rainy summer in the recollection of old residents had been experienced up to August 1. Otherwise, everything is highly favorable to excellent solar-constant work. If war conditions warrant, the Institution still hopes to send the expedition to South America later, where a station is selected at which 300 cloudless forenoons for observing per year are to be expected.

Before leaving this subject I desire to call attention to the remarkable paper by Dr. H. Helm Clayton (Smith. Misc. Collections, vol. 68, No. 3) on the "Effect of Short Period Variations of Solar Radiation on the Earth's Atmosphere." Dr. Clayton shows by the mathematical method of correlations, free from all influence of personal judgment, that variations of solar radiation observed by us at Mount Wilson in 1913 and 1914 were reflected in variations of terrestrial ratures all over the world. The correlations were positive in ar the Tropics, negative in temperate zones, and positive near les. A lag of from 1 to 5 days occurred, the lag being less for l zones. The barometric pressure also appeared to join in the tions. By an ingenius application of his method Dr. Clayton that the short interval fluctuations of solar radiation are not ther without periodicity, for the changes tend to repeat them- after 11 and 22 days, respectively. The same tendency is in the temperature records of Buenos Aires. We are now en- in testing this conclusion by computations for other years.

putations of Mount Wilson solar observations went on in the of Miss Graves as usual at Washington, and the computing is cally up to date.

Fowle's research on the effect of water vapor and carbon le of the atmosphere to absorb long-wave rays, such as the earth out, is now ready for publication. Many of the best observa- were made by him during the past year. Some observations in February, 1917, at a time when the humidity of the atmos- was very small, proved of special value. Opportunity was of using some of the apparatus prepared for the South Amer- xpedition to aid in making bolographic observations on the spectrum at very great wave lengths, reaching to 17 microns. eans of the spectro-bolometer prepared for South America it ossible to determine accurately the quantities of water vapor path of the solar beam.

tain conclusions stated in Volume II of the Annals of the Astro- al Observatory may now be corrected to correspond with the nformation. We stated:

> an by no means admit that the radiation from the solid and liquid sur- f the earth passes unhindered to space. * * * The clouds, whose e presence includes 52 per cent of the time. * * * are even more t screens to the radiation of the earth than they are to the radiation of a, so during 52 per cent of the time we may regard the radiation of the nd liquid earth to space as zero. During the remainder of the time vapor presents almost as effective a screen * * *. From the com- work of Rubens and Aschkinass, Langley, Keeler and Very, and Nichols, * * conclude that a tenth part of the average amount of water vapor vertical column of atmosphere above sea level is enough to absorb more alf of the radiation of the earth to space, and it is highly probable that, ring the greater air mass attending the oblique passage of many of the space, nine-tenths of the radiation of the solid and liquid surface of th is absorbed by the water vapor of the atmosphere even on clear days. udy days none is transmitted, so that the average escape of radiation he earth's surface to space probably does not exceed 5 per cent.
>
> e writers have attributed a large share of the absorption of the atmos- to the carbonic-acid gas which it contains, but * * * in atmospheric ions the absorption of carbonic acid gas in the spectrum of the earth s to be confined to two bands extending from wave lengths 3.6 to 5.4μ.

> and from 13.0 to 16.0μ, respectively. In these bands its absorption is nearly total from 4.0 to 4.8μ and from 14.0 to 15.6μ even when carbonic-acid gas is present in much less quantities than the atmosphere contains. * * * In the absence of water vapor the total absorption possible by carbonic-acid gas would be 14 per cent. In all the lower regions of the atmosphere, however, water vapor is present in such quantities as almost completely to extinguish the radiation of the earth's surface in these two special regions. * * * It therefore does not appear possible that the presence or absence, or increase or decrease, of the carbonic-acid contents of the air are likely to appreciably influence the temperature of the earth's surface.
>
> It seems certain, in view of what has been said that the earth's solid and liquid surfaces, and the lower parts of the atmosphere, contribute directly almost nothing to the amount of radiation which the earth as a planet sends to space. The earth's surface and the lower atmosphere, of course, exchange radiation together, and by this process and by convection the heat of these regions ascends toward space. But convection grows less and less as the air becomes rarer, and must at length cease to be an appreciable factor. It is the water vapor and carbonic-acid gas far above the earth's surface, where the absorption of the rays by the water vapor and carbonic-acid gas lying still higher becomes small, that form the true radiating surface of the earth considered as a planet. * * * With the scanty material at hand, and in consideration of the distribution of water vapor in the free air, it seems safe to put the effective position of the radiating surface at fully 4,000 meters above sea level * * * at a probable mean temperature of 263° absolute centigrade or —10° centigrade.

Some writers have misinterpreted these remarks and understood us as supposing that there is a special layer at 4,000 meters elevation above sea level which prevents radiation escaping from below and whose own radiation passes unhindered to space. Our meaning was quite different. Every layer from sea level to the limit of the atmosphere contributes something to the total radiation output of the earth. But, because of the great absorption of superposed water vapor and clouds, the lower solid and liquid and atmospheric layers contribute little, while because of their dryness the higher atmospheric layers contribute little. Roughly estimating the various factors, we concluded that the center of activity of the radiation of the earth as a planet could be set at about 4,000 meters elevation.

How far are these conclusions now to be altered? As to the effect of cloudiness, not at all. As to water vapor Mr. Fowle finds the following results on the percentages of absorption of rays from a perfect radiator at the earth's mean temperature in atmospheric columns containing besides carbon-dioxide sufficient to produce maximum absorption, water vapor which if precipitated would produce certain depths of liquid water:

Ppt. water ^{cm}	0.003	0.03	0.3	3.0
Absorption	49	57	66	75

In order to apply these data I give figures for the average quantities of terrestrial water vapor which, according to Hann, exist in vertical olumns from sea level to the limit of the atmosphere over different ones of the earth.

Latitude	0-20°	20°-30°	30°-40°	40°-50°	50°-60°	60°-90°
Ppt. water cm.	4.3	3.1	2.2	1.6	1.0	0.6

From these figures it may be seen that the statement, "a tenth art of the average amount of water vapor in the vertical column ove sea level is enough to absorb more than half of the radiation of e earth is space," is confirmed. But the conclusion therefrom that nine-tenths of the radiation of the solid and liquid surface of the rth is absorbed by the water vapor of the atmosphere on clear days" not confirmed. Mr. Fowle has computed the absorption of the atmosphere in a state of humidity corresponding to 1.0 cm. ppt. water, nd finds it 72 per cent. Considering that the ppt. water in a vertical olumn over most of the earth exceeds 3.0 cm., it now seems probable hat the proper figure should be eight-tenths instead of nine-tenths.

As regards the absorption of carbonic-acid gas Mr. Fowle finds hat one-fortieth part of the amount of this gas found in a vertical tmospheric column produces the maximum possible effect. This oes not lead to any modification of our conclusions as to the effect of tmospheric carbonic acid gas as stated above.

With ordinary humidity, at sea level a layer of air 10 meters long, ccording to Fowle, will absorb 50 per cent of the radiation of a erfect radiator at terrestrial temperatures. Similarly the layer of ir above 11 kilometers, or 6 miles, altitude contains enough water apor to absorb 50 per cent of such radiation.

In view of what has been said and remembering the presence of louds, only about one-tenth of the radiation of the solid and liquid urface of the earth escapes directly to space. The atmosphere bove 11 kilometers apparently contributes more than half of the adiation of the earth viewed as a planet and prevents half of the adiation of lower layers from escaping. Nearly the entire output f radiation of the earth to space, certainly more than three-fourths, rises from the atmosphere and its clouds as its source. The "effective radiating layer," meaning a layer which if perfectly radiating to space would equal in radiation the actual earth viewed as a planet, may still be thought of as at several kilometers altitude and at a emperature well below freezing.

The subject of atmospheric absorption is so difficult both theoretically and experimentally that much more investigation ought still o be done on it. Mr. Fowle's long experience has well fitted him or making further advances. It is hoped to put at his disposal oon the necessary means to make new researches. These include olometric apparatus of greatly increased sensitiveness, such recent studies now enable us to construct. The one obstacle to complete success which now seems insuperable is the lack of any means to form an intense unabsorbed spectrum free from stray light, extending from 15 to 50 microns in wave length.

2. AT MOUNT WILSON.

The expedition of 1916 continued "solar-constant" and other observations at Mount Wilson until late in October. The expedition was renewed late in June, 1917. Improvements in the supply of electricity and water to the station were completed in June, 1917.

In 1916 many observations of the sky by day and by night were made at Mount Wilson with the pyranometer. The plan was followed from August to October of measuring with this instrument the total solar radiation at a fixed zenith distance of the sun, and almost simultaneously the total sky radiation over a fixed small area immediately surrounding the sun. It seems probable that as the brightness of the sky depends on the prevailing humidity and dust, and as the radiation of the sun is diminished by presence of humidity and dust, a method of combination of the two measurements may be found, adapted to give approximately the "solar constant." When computations are further advanced the matter will be tested.

Restandardization of secondary pyrheliometers in 1916 against our standard water-flow pyrheliometer indicated no change in their constants.

A vacuum bolometer was employed during a large part of the observing season. The sensitiveness was so much greater that considerable improvement in the work on the investigation of the distribution of radiation over the sun's disk was possible.

Redeterminations were made with great care on the form of distribution of the solar energy curve outside the atmosphere. New mirrors of stellite, a very hard nontarnishing alloy, were substituted for the silvered mirrors of the spectrobolometer. It is hoped that the work of 1916 will indicate conclusively how the sun's variations affect the distribution of energy in the solar spectrum.

SUMMARY.

Preparation of apparatus and equipment for a new "solar-constant" station of the Smithsonian Institution, now located at Hump Mountain, N. C., led to valuable improvements in the bolometer and the pyranometer, and to the invention and construction of a new instrument for avoiding computation in reduction of spectro-bolometric observations.

A long research on the transmission of long-wave rays by atmospheric columns of known humidity and carbon-dioxide contents,

been completed and prepared for publication by Mr. Fowle. In
ditions to Mount Wilson the observation of the amount and
ribution of solar radiation has been continued. In cooperation
the new station above mentioned it is hoped to obtain much
e complete records of the variation of the sun, now shown by
ton to be of great meteorological significance.

espectfully submitted.

C. G. Abbot,
Director Astrophysical Observatory.

r. Charles D. Walcott,
Secretary of the Smithsonian Institution.

APPENDIX 6.

REPORT ON THE LIBRARY.

SIR: I have the honor to submit the following report on the activities of the library of the Smithsonian Institution during the fiscal year ending June 30, 1917.

The Smithsonian library was founded with the definite plan that it should contain publications of the scientific institutions and learned societies of the world, together with a collection of periodicals and publications of a scientific nature. The most important function contemplated was that of reference for research in the broadest sense, and in this connection a complete collection of the catalogues of the libraries of the world was also contemplated. This policy has been continued with the result that the vast series of scientific publications in the Smithsonian library, now numbering a half million of titles, has been brought together.

As early as 1865 Secretary Henry realized that it would not be possible to adequately care for the entire collection in the Smithsonian building, even if the entire building were devoted to the purpose; and a special act of Congress authorized the Library of Congress to assume the care of the main library of the Smithsonian Institution, the Institution to retain ownership of the publications and to have the same use of the books as if they were in its own building, and in addition to have the same privileges in the use of the Library of Congress as Members of Congress. While the main collection is in the Library of Congress, there are smaller collections here in the Institution, i. e. the books for office reference, dictionaries, encyclopaedias, etc., the Government branch libraries of the Astrophysical Observatory, Bureau of American Ethnology, and the United States National Museum. All of these are confined to special publications relating to the subjects covered by the bureaus, and supplement rather than duplicate books in other libraries.

The library of the Smithsonian Institution is augmented in two ways, i. e., by gift, and through the exchange of the Institution's publications for those of similar institutions.

JOHN DONNELL SMITH LIBRARY.

In 1905 Dr. John Donnell Smith, of Baltimore, Md., offered to he Smithsonian Institution his botanical library consisting of over ,500 volumes, to accompany his herbarium to which it is closely elated. The proposed gift was the most valuable of its kind that ad been offered to the Institution, and it will be of great assistnce in the development of botanical research in the Museum. The onditions were that Dr. Smith should retain possession of the books s long as he desired, and that when his library should come to the nstitution it should be kept separately and each book should have a ook plate indicating that he was the donor. A plate was immediately designed and engraved, and the ex-libris labels were printed and sent to Dr. Smith, who had them placed in each one of he books. In January of the present year the first consignment f these books for the library was received, and they were at once placed in a separate stack in the Smithsonian building and kept ogether. The number sent amounted to 461 bound volumes, 100 unbound volumes, some incomplete, and 293 pamphlets.

EXCHANGES.

Special efforts have been made to meet the conditions coexistent with the third year of war in the matter of preserving and promoting foreign exchange relations, and the generous response met with has been very gratifying. On the other hand, a number of mportant publications have been suspended owing to the death or absence of collaborators; and still others will be withheld pending ermination of the war, while the uncertainties of transportation have resulted in the loss of a number of valuable publications from abroad. The policy of broadening exchange relations with South and Central America has been inaugurated.

ACCESSIONS.

Additions to the library, consisting mainly of gifts and exchanges, were received in 24,292 packages. Of these 23,307 were received by mail and 985 through the International Exchange Service. Correspondence in connection therewith amounted to about 1,245 letters and 2,126 acknowledgments on the regular printed forms.

The cataloguing, not including publications for the Bureau of American Ethnology and the National Museum, reported elsewhere, covered 3,546 volumes and 47 charts. Of these 698 were new titles added to the author catalogue and 59 new periodicals. In addition to 1,500 printed cards received from the Library of Congress, 1,855 new typewritten cards were prepared. There were 976 volumes recatalogued.

SMITHSONIAN MAIN LIBRARY.

Publications for the Smithsonian main library have been forwarded to the Smithsonian deposit in the Library of Congress as received, after being duly entered on the records. During the fiscal year 2,886 of these were catalogued and accessioned, consisting of 1,736 volumes, 301 parts of volumes, 805 pamphlets, and 44 charts, thereby extending the accession numbers from 525,256 to 527,150. Several thousand publications remained unaccessioned at the close of the year, owing to a position of cataloguer being vacant for over nine months. The existing practice of transferring to the Library of Congress, without stamping or recording, public documents received in exchange for Smithsonian publications, mainly of a statistical character, has been continued, with the result that 2,349 were forwarded in this manner.

During the year the titles of 757 new publications were added to the catalogue. Want cards to the number of 535 for series in the Smithsonian division at the Library of Congress were considered with the result that 154 volumes, 571 parts of volumes, and 51 title-pages were secured, thus completing 44 sets to date. There were received from the periodical division 105 cards, action on which resulted in securing 9 volumes, 79 parts of volumes, and 32 title-pages; and in response to 32 cards from the order division, 28 volumes and 12 parts were obtained.

The number of dissertations and technological publications received showed a marked decrease over previous years. They were contributed by the following:

Kejserliga Alexanders-Universitet i Finland.
Technische Hochschule, Breslau.
Kongliga Tekniska Högskolan, Stockholm.
University of Würzburg.
University of Breslau.
Königlich Sächsische Technische Hochschule, Dresden.

Office reference library.—The accessions for the office library, which includes the Astrophysical Observatory and the National Zoological Park, amounted to 1,025 publications, distributed as follows: Office library, 899 volumes and pamphlets; Astrophysical Observatory, 55 volumes, 18 parts of volumes, and 39 pamphlets; National Zoological Park, 11 volumes and 3 pamphlets.

Reading room.—The reading room has now about 311 foreign and domestic periodicals, which have been in constant use by the staff and members of the scientific bureaus of the Government. During the year 3,701 publications from the reading and reference rooms were in circulation, of which 3,367 were single numbers of periodicals and 334 were bound volumes.

The aeronautical library.—The aeronautical library is probably ie of the most complete series on the subject in the United States, id the policy has been to maintain it as such.

Before Dr. Langley came to the Smithsonian Institution as asstant secretary he had made a collection of what had been pubshed relating to aeronautics. Later, when he became secretary and ublished his epoch-making works "Experiments in Aerodynamics" ad "Internal Work of the Wind," the number of publications was radually growing, so that when his successful experiments were iade with the heavier-than-air models the Institution had the most omplete library of aeronautical literature in the United States. Vith this collection of books as a basis, a bibliography was prepared y me to cover all existing literature up to 1909. Since that time ie securing of publications has continued, and every possible effort as been made to have it complete. Dr. Alexander Graham Bell, regent of the Institution, has also shown an interest in this collecion by contributing his entire working library of books and newsaper clippings relating to aeronautics, arranged and mounted, hich is a valuable addition in supplementing the series already in he Institution.

There are now on hand 1,009 volumes and 83 titles of periodicals. Vith the close of the year a second part of the bibliography of eronautics is in preparation by me for the National Advisory Comnittee for Aeronautics at the suggestion of the secretary, which will omplete the references from 1909 to the end of 1916.

Art room.—No additions have been made to the collection of pubications relating to art in the art room, in view of the fact that all f those relating to the fine arts have been placed in the sectional ibrary of administration for use in connection with the National allery of Art, and those relating to the reproductive processes for ngraving have been placed in the sectional library of the Division f Graphic Arts in the Museum.

Employees' library.—The condition of the employees' library has emained practically the same as last year, with no additions. If ioney were available, it could be used to great advantage in adding ome of the latest literature in fiction and other classes. The library as been in constant use, and 304 volumes were circulated during the ear.

John Watts de Peyster collection.—This collection of Napoleona s probably the most unique collection of publications relating to Napoleon in the United States, and was brought together by Gen. John Watts de Peyster to include works relating to Napoleon as a general. It covers the period from the end of the Napoleonic wars to the present great struggle. There are many calls for these publications, and some means must be found to make them available. So far it has not been possible to do this with the present staff, and a cataloguer with a knowledge of French history should be employed for the special purpose of cataloguing this collection. Every effort is being made now to make the books available, but without an adequate catalogue they can not be used to the fullest extent.

NATIONAL MUSEUM LIBRARY.

The value of the library of the National Museum is largely due to the systematic collecting of works relating to the subjects covered by the collections in the Museum and at the same time supplementing as far as possible series in other libraries of Washington. The books are consulted by persons carrying on research work in almost every branch of the Government service, including those who are doing scientific work along similar lines. The publications for the library come to the Museum by gift, by exchange of publications, and by purchase. Many important gifts have been received from specialists, and those received during the year are given in detail. The exchanges, as is the case with the Smithsonian library, have met with many difficulties raised by war conditions in the matter of securing foreign publications, which have been put partially overcome. The situation in this respect has, on the whole, shown no appreciable amelioration over the preceding year. Special effort, however, has been directed toward maintaining the foreign exchanges at the maximum compatible with existing conditions. In connection with this work 271 letters were written in securing a number of new titles and in filling "wants" in many of the incomplete sets on hand. The appropriation for the purchase of books is very small and has been the same for a number of years, and it is only by judicious spending that the urgent needs of the Museum can be secured.

The library was fortunate enough to secure by purchase the following three rare books, the editions of which are not represented in the United States:

Boddaert, P.: Elenchus animalium, I Roterodami, 1784.
Forster, J. R.: Afrikanischen Vögel. Halle, 1798.
Vroeg, A.: Catalogus . . . Vogelen, etc., s'Gravenhage, 1764, with separately paged "adumbratiunculae."

Mearns collection.—One collaborator who had taken a special interest in the library was Dr. Edgar A. Mearns, the announcement of whose death was received with deep regret last fall. Dr. Mearns contributed publications to the library each year as well as a collection of Korans, and after his demise his widow carried out his expressed wish in presenting the remainder of his scientific library to the Museum. This collection is especially rich in works on mammals, birds, and plants.

Dall collection.—The continued interest of Dr. William Healey Dall in the books relating to mollusks, which form the sectional library of the division of mollusks, has resulted in the further addition of 307 titles during the past year.

Other members of the scientific staff who have contributed to the collection in the library are: Dr. C. D. Walcott, Dr. O. P. Hay, Dr. C. W. Richmond. Mr. W. R. Maxon, Mr. W. H. Holmes, Dr. J. C. Crawford.

Accessions.—There are now in the Museum library 132,203 publications, consisting of 49,285 volumes, 82,794 pamphlets and unbound papers, and 124 manuscripts. Of these 1,572 volumes, including 949 completed volumes of periodicals, 3,556 pamphlets, and 65 parts of volumes, were accessioned during the past year.

Cataloguing.—As in the past, new material has been promptly entered and placed on the shelves or assigned to the sectional libraries. The cataloguing covered 623 books, 949 completed volumes of periodicals, and 373 pamphlets: in addition, 10,142 periodicals were entered. There were also 4,522 section cards made out covering publications assigned to sectional libraries.

Loans.—The loans from the general library during the year covered by this report totaled 12,869 publications, in which are included 3,035 books borrowed from the Library of Congress, including the Smithsonian deposit, and 496 books borrowed from other libraries. In addition, 5,580 books were consulted in the reading room of the library.

Binding.—The serious situation with regard to publications remaining unbound is being gradually relieved, but much remains to be done. During the past year 1,377 such publications were prepared for binding and sent to the Government binder. Of these 685 were returned within the year.

Technological series.—Additions to the technological library were composed of 374 volumes, 3,826 parts of volumes, 802 pamphlets, and 5 maps. There were filed 352 cards for books catalogued. A file of approximately 2,500 printed cards covering Smithsonian publications was received and incorporated in the catalogue. In the scientific depository catalogue 1,507 author cards were filed, and to 4,515 additional cards subject headings were added, increasing the catalogue by 6,022 cards.

Books and periodicals loaned during the year numbered 133 volumes and 297 parts of volumes and pamphlets, making a total circulation of 430 publications. About 620 volumes were consulted in the reading room of the library.

Several sets have been rearranged and more logically classified. In addition, a set of duplicates has been gone over, sorted, and arranged by class number. Of the duplicates received 89 were volumes and 1,328 parts of volumes and pamphlets.

Sectional libraries.—The series of publications in the sectional libraries were dormant until a few years ago, and no effort was made to add to the collection of books in these libraries, the whole matter being held in abeyance until the work on the collections had been resumed. Books on the various subjects covered have, therefore, been sought and the number augmented. During the interval, however, the future need of publications for working up the collections was never lost sight of and there were a number of the serials bound and ready for use. Toward the end of the year two cataloguers were employed in the division of mineral technology to put the books on hand in the very best of order and for the making of a special author and subject catalogue, so that with the close of the year the work has been completed and this sectional library is in excellent condition. It is hoped that during the present year it will be possible to do the same thing for the division of textiles. This will, however, not be possible with the present force, which is too small.

With the death of Mr. Thomas W. Smillie, who was for many years custodian of the section of photography in the division of graphic arts, it was necessary that all books in the section should be checked up. A special cataloguer was employed for the purpose and the books and pamphlets were put in order and catalogued, periodical series arranged on the shelves and lacking numbers indicated in order that the sets could be completed. The work was finished by June 30.

The following is a complete list of the sectional libraries:

Administration.
Administrative assistant's office.
Anthropology.
Biology.
Birds.
Botany.
Comparative anatomy.
Editor's office.
Ethnology.
Fishes.
Forestry.
Geology.
Graphic Arts.
History.
Insects.
Invertebrate paleontology.
Mammals.
Marine invertebrates.
Materia medica.
Organic industries.
Mechanical technology.
Mesozoic fossils.
Mineral technology.
Minerals.
Mollusks.
Oriental archeology.
Paleobotany.
Parasites.
Photography.
Physical anthropology.
Prehistoric archeology.
Property clerk.
Reptiles and batrachians.
Superintendent's office.
Taxidermy.
Textiles.
Vertebrate paleontology.

BUREAU OF AMERICAN ETHNOLOGY LIBRARY.

This library is administered under the direct care of the ethnologist in charge, and a report on its operations will be found in the report of that bureau.

ASTROPHYSICAL OBSERVATORY LIBRARY.

The collection of reference works relating to astrophysics has been n constant use. During the year 55 volumes, 18 parts of volumes, nd 39 pamphlets were added to this library.

NATIONAL ZOOLOGICAL PARK LIBRARY.

This collection contains publications relating to the work of the ark, and while not large is a strictly working library. During the ast year 11 volumes and 3 pamphlets were added to the series.

SUMMARY OF ACCESSIONS.

The accessions during the year, with the exception of the library f the Bureau of American Ethnology, may be summarized as ollows:

o the Smithsonian deposit in the Library of Congress, including parts to complete sets	2,886
o the Smithsonian office, Astrophysical Observatory, and National Zoological Park	1,025
o the United States National Museum	5,193
Total	9,104

Respectfully submitted.

Paul Brockett,
Assistant Librarian.

Dr. Charles D. Walcott,
Secretary of the Smithsonian Institution.

APPENDIX 7.

REPORT ON THE INTERNATIONAL CATALOGUE OF SCIENTIFIC LITERATURE.

SIR: I have the honor to submit the following report on the operations of the United States Bureau of the International Catalogue of Scientific Literature for the fiscal year ending June 30, 1917:

This international enterprise was, at the beginning of the present war, being carried on through the cooperation of the 34 following-named countries: Argentine Republic, Austria, Belgium, Canada, Chili, Cuba, Denmark, Egypt, Finland, France, Germany, Greece, Holland, Hungary, India and Ceylon, Italy, Japan, Mexico, New South Wales, New Zealand, Norway, Poland, Portugal, Queensland, Russia, South Africa, South Australia, Spain, Straits Settlements, Sweden, Switzerland, United States of America, Victoria and Tasmania, and Western Australia. Each of these countries supported a regional bureau whose duty it was to furnish to the central bureau in London classified index citations to all the scientific literature published within their several regions.

As the greater part of these countries are now actually engaged in hostilities it is natural that scientific research and publication would be much affected, and that such an international cooperative enterprise as the International Catalogue would find itself in many difficulties. Not only have the number of scientific papers being published greatly decreased but the difficulty of preparing and publishing a regular index has increased owing to the impossibility of obtaining necessary scientific and clerical assistance to aid in the preparation and publication of the catalogue. The London Central Bureau was, however, able to publish four volumes of the catalogue during the fiscal year, these volumes were the twelfth annual issue of Geology and the thirteenth annual issue of Chemistry, Anatomy, and Botany. All of the eleventh annual issue has now been published together with 15 volumes of the twelfth annual issue, 13 volumes of the thirteenth annual issue, and 1 volume of the fourteenth annual issue, making a total of 216 regular volumes published since the beginning of the enterprise in 1901. In addition to these regular volumes several special volumes of schedules, lists of journals, etc., have been published.

Almost three million references to current scientific publications re contained in these 216 volumes, about 12 per cent of which have een supplied by this bureau.

Owing to the dangers and difficulties of transportation much of the material prepared by this bureau for incorporation in the catalogue uring the present year has been held until such time as it can be afely forwarded to London.

It is not to be expected that the publication of the catalogue an be regularly carried on until after the return of peace, but it ppears that the organization is holding together better than might e expected under existing conditions and that when peace is declared t will only be necessary to resume, rather than reorganize, the work.

When it is possible for all the regional bureaus to fully resume he preparation of the Catalogue it is to be hoped that every effort will then be made to carry out one of the most important resolutions adopted at the last convention of the International Catalogue, held in London in 1910. This resolution was:

> (1) To take all possible steps to prevent reduplication by the publication of several annual and similar catalogues and indexes on the same subject, by making arrangements such as those now in force with the Zoological Society of London.
>
> (2) To obtain further assistance and cooperation in the preparation of the material of the catalogue from the principal scientific societies and academies and the organizations which collect materials for indexing scientific literature.

Scientific bibliographic work is seldom if ever self-supporting, and after the war it will undoubtedly be more than ever necessary o exercise every possible economy in the preparation and publicaion of scientific indexes and yearbooks, so that the editors and publishers of all such publications will find it greatly to their adantage to cooperate with the International Catalogue to the fullest possible extent and thus prevent the reduplication referred to in he resolution quoted above. This will benefit not only the International Catalogue and the publishers of the other bibliographies, but will greatly lessen the labors of librarians and scientific investigators who have occasion to use such works of reference.

More than ever before the line of demarcation between the reearches of pure science and the practical application of such reearches is being eliminated, and laboratory experiments of to-day may to-morrow be in actual use in ways vitally affecting the welfare of man. It is becoming more than ever difficult to define what is pure science and what is applied science and the heretofore arbitrary, though at the time necessary, limitation of the scope of the International Catalogue to include papers on pure science only should now be so broadened as to include at least some of the applied sciences, which have in the last few years advanced with such unprecedented strides. The inclusion of papers dealing with the application of scientific discoveries would undoubtedly greatly increase the size and cost of the catalogue, but on the other hand its value and use would be so increased that the demand and consequent sales of the catalogue would more than offset any additional cost.

Very respectfully, yours,

Leonard C. Gunnell,
Assistant in Charge.

Mr. Charles D. Walcott,
Secretary of the Smithsonian Institution.

APPENDIX 8.

REPORT ON THE PUBLICATIONS.

SIR: I have the honor to submit the following report on the pubcations of the Smithsonian Institution and its branches during e year ending June 30, 1917:

The Institution proper published during the year 1 memoir in e series of Contributions to Knowledge, 19 papers in the series of iscellaneous Collections, and 6 special publications. The Bureau American Ethnology published 1 annual report, 2 bulletins, and list of publications of the bureau. The United States National useum issued 1 volume of the Proceedings, 73 papers forming parts this and other volumes, and 6 bulletins.

The total number of copies of publications distributed by the stitution and its branches was 158,797, which includes 2,673 volmes and separates of the Smithsonian Contributions to Knowledge, 3,615 volumes and separate pamphlets of Smithsonian Miscellaneous ollections, 21,865 volumes and separate pamphlets of Smithsonian nnual Reports, 64,365 volumes and separates of National Museum ublications, 11,984 publications of the Bureau of American Ethology, 4,182 special publications, 23 volumes of the Annals of the strophysical Observatory, 29 reports of the Harriman Alaska Exedition, and 53 reports of the American Historical Association.

SMITHSONIAN CONTRIBUTIONS TO KNOWLEDGE.

QUARTO.

VOLUME 35.

o. 3. A contribution to the comparative histology of the femur. By J. S. Foote. February 6, 1917. ix+242 pp., 38 pls. (Publ. 2382.)

itle-page and table of contents. April 4, 1917. (Publ. 1740.)

SMITHSONIAN MISCELLANEOUS COLLECTIONS.

OCTAVO.

Of the Miscellaneous Collections, volume 63, 1 paper was pubished; of volume 64, 1 paper; of volume 66, 11 papers; of volume 67, papers; of volume 68, 4 papers; in all, 19 papers, as follows:

VOLUME 63.

No. 6. Smithsonian Physical Tables. Second reprint of sixth revised edition. By F. E. Fowle. January 12, 1917. xxxvi+355 pp. (Publ. 2269.)

VOLUME 64.

No. 5. Cambrian Geology and Paleontology. III. No. 5. Cambrian trilobites. By Charles D. Walcott. September 29, 1916. Pp. 303–456, pls. 45–67. (Publ. 2420.)

VOLUME 66.

No. 6. Phonetic transcription of Indian languages. Report of Committee of American Anthropological Association. 15 pp. (Publ. 2415.)

No. 9. Maxonia, a new genus of tropical American ferns. By Carl Christensen. September 30, 1916. 4 pp. (Publ. 2424.)

No. 10. Three new murine rodents from Africa. By N. Hollister. October 26, 1916. 3 pp. (Publ. 2426.)

No. 11. On the use of the pyranometer. By C. G. Abbot and L. B. Aldrich. November 6, 1916. 9 pp. (Publ. 2427.)

No. 12. Bones of mammals from Indian sites in Cuba and Santo Domingo. December 7, 1916. 10 pp., 1 pl. (Publ. 2429.)

No. 13. The teeth of a monkey found in Cuba. By Gerrit S. Miller, jr. December 8, 1916. 3 pp., 1 pl. (Publ. 2430.)

No. 14. Preliminary survey of the remains of the Chippewa settlements on La Pointe Island, Wisconsin. By Philip Ainsworth Means. January 4, 1917. 15 pp., 2 maps. (Publ. 2433.)

No. 15. Three remarkable new species of birds from Santo Domingo. By J. H. Riley. December 1, 1916. 2 pp. (Publ. 2435.)

No. 16. The determination of meteor orbits in the solar system. By G. von Niessl. April 23, 1917. 35 pp. (Publ. 2436.)

No. 17. Explorations and field work of the Smithsonian Institution in 1916. April 26, 1917. 134 pp. (illustrated). (Publ. 2438.)

No. 18. On the occurrence of Benthodesmus atlanticus Goode and Bean on the coast of British Columbia. By C. H. Gilbert. February 21, 1917. 2 pp. (Publ. 2439.)

VOLUME 67.

No. 1. Cambrian Geology and Paleontology. IV, No. 1. Nomenclature of some Cambrian Cordilleran formations. By Charles D. Walcott. May 9, 1917. pp. 1–8. (Publ. 2444.)

No. 2. Cambrian Geology and Paleontology. IV, No. 2. The Albertella fauna in British Columbia and Montana. By Charles D. Walcott. May 9, 1917. pp. 9–59, pls. 1–7. (Publ. 2445.)

VOLUME 68.

No. 1. Archeological investigations in New Mexico, Colorado, and Utah. By J. Walter Fewkes. May 15, 1917. 38 pp., 14 pls. (Publ. 2442.)

No. 2. Recognition among insects. By N. E. McIndoo. April 30, 1917. 78 pp. (Publ. 2443.)

No. 3. Effect of short period variations of solar radiation on the earth's atmosphere. By H. Helm Clayton. May 21, 1917. 18 pp., 8 charts. (Publ. 2446.)

No. 4. Preliminary diagnosis of new mammals obtained by the Yale-National Geographic Society Peruvian Expedition. By Oldfield Thomas. April 10, 1917. 3 pp. (Publ. 2447.)

SMITHSONIAN ANNUAL REPORTS.

Owing to the congestion of work at the Government Printing ffice on account of the war, the Smithsonian Report for 1916, which as ready for printing in April, was not yet off the press at the ose of the fiscal year.

SPECIAL PUBLICATIONS.

The following special publications were issued during the year:

iblications of the Smithsonian Institution issued between January 1 and June 30, 1916. 3 pp. (Publ. 2422.)

iblications of the Smithsonian Institution issued between January 1 and September 30, 1916. 3 pp. (Publ. 2425.)

iblications of the Smithsonian Institution issued between January 1 and December 31, 1916. 3 pp. (Publ. 2587.)

iblications of the Smithsonian Institution issued between January 1 and March 31, 1917. 1 p. (Publ. 2448.)

assified list of Smithsonian publications available for distribution December 15, 1916. vi+32 pp. (Publ. 2434.)

he Smithsonian Institution (descriptive folder). 17 pp. (Publ. AQ.)

PUBLICATIONS OF THE UNITED STATES NATIONAL MUSEUM.

The publications of the National Museum are: (*a*) The annual eport to Congress; (*b*) the Proceedings of the United States Na-onal Museum; and (*c*) the Bulletin of the United States National Iuseum, which includes the Contributions from the United States Iational Herbarium. The editorship of these publications is vested i Dr. Marcus Benjamin.

During the year the Museum published 1 volume of the Proceed-igs and 73 separate papers forming parts of this and other volumes, nd 6 bulletins.

The issues of the Proceedings were as follows: Volume 50; volume 1, papers 2139–2172; volume 52, papers 2173–2193; volume 53, apers 2194–2206, 2208, and 2210–2212.

The Bulletins were as follows:

ulletin 71, A monograph of the foraminifera of the North Pacific Ocean, Part VI, Miliolidae, by Joseph A. Cushman.

ulletin 93, The sessile barnacles (Cirripedia) contained in the collections of the U. S. National Museum; including a monograph of the American species, by Henry A. Pilsbry.

ulletin 96, A synopsis of American early Tertiary Cheilostome Bryozoa, by Ferdinand Canu and Ray S. Bassler.

ulletin 98, The birds of the Anamba Islands, by Harry C. Oberholser.

olume 16, Contributions from the U. S. National Herbarium, entitled "Systematic investigations in Phanerogams; ferns, and mosses," by various authors.

olume 17, Contributions from the U. S. National Herbarium entitled "Systematic investigations in lichens and ferns, grasses, and other Phanerogams," by various authors.

PUBLICATIONS OF THE BUREAU OF AMERICAN ETHNOLOGY.

The publications of the Bureau are discussed in appendix 2 of the Secretary's report. The editorial work of the Bureau has continued in charge of Mr. J. G. Gurley, editor.

During the year, 1 annual report, 2 bulletins, and a list of publications were issued, as follows:

Thirty-first Annual Report of the Bureau of American Ethnology (containing an accompanying paper. "Tsimshian Mythology" (Boas)).

Bulletin 40, part 2 (edited by Boas), "Coos, an illustrative sketch," by Leo J. Frachtenberg.

Bulletin 55, Ethnobotany of the Tewa Indians, by Robbins, Harrington, and Freire-Marreco.

List of publications of the Bureau of American Ethnology.

At the close of the fiscal year there were in press or in preparation 4 annual reports and 7 bulletins.

REPORT OF THE AMERICAN HISTORICAL ASSOCIATION.

The annual reports of the American Historical Association are transmitted by the association to the Secretary of the Smithsonian Institution and are communicated to Congress under the provisions of the act of incorporation of the association.

Volume 1 of the annual report for 1914 was issued during the year, and volume 2 of this report and the report for 1915 were in press at the close of the year.

REPORT OF THE NATIONAL SOCIETY OF THE DAUGHTERS OF THE AMERICAN REVOLUTION.

The manuscript of the Nineteenth Annual Report of the National Society of the Daughters of the American Revolution for the year ending October 11, 1916, was communicated to Congress on February 5, 1917.

THE SMITHSONIAN ADVISORY COMMITTEE ON PRINTING AND PUBLICATION.

The editor has continued to serve as secretary of the Smithsonian advisory committee on printing and publication. This committee passes on all manuscripts offered for publication by the Institution or its branches, and considers forms of routine, blanks, and various other matters pertaining to printing and publication. Sixteen meetings were held during the year and 101 manuscripts were acted upon.

Respectfully submitted.

A. Howard Clark, *Editor.*

Dr. Charles D. Walcott,
Secretary of the Smithsonian Institution.

○

REPORT OF THE SECRETARY OF THE SMITHSONIAN INSTITUTION

FOR THE YEAR ENDING JUNE 30

1918

(Publication 2528)

WASHINGTON
GOVERNMENT PRINTING OFFICE
1918

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REPORT

OF THE

SECRETARY OF THE SMITHSONIAN INSTITUTION

CHARLES D. WALCOTT

FOR THE YEAR ENDING JUNE 30, 1918.

To the Board of Regents of the Smithsonian Institution.

GENTLEMEN: I have the honor to submit herewith the customary annual report by the secretary on the present condition and the operations and activities of the Institution and its branches during the year ending June 30, 1918. The first portion of the report is devoted to the Institution proper and the summaries of the work of the National Museum and other branches, while the appendixes give detailed accounts by those in direct charge of the activities of the Museum, the Bureau of Ethnology, the International Exchanges, the Zoological Park, the Astrophysical Observatory, the Library, and the Catalogue of Scientific Literature.

THE SMITHSONIAN INSTITUTION.

THE ESTABLISHMENT.

The Institution was created an establishment by act of Congress approved August 10, 1846. Its statutory members are the President of the United States, the Vice President, the Chief Justice, and the heads of the executive departments.

THE BOARD OF REGENTS.

The Board of Regents, which is charged with the administration of the Institution, consists of the Vice President and the Chief Justice of the United States as ex officio members, three Members of the Senate, three Members of the House of Representatives, and six citizens, "two of whom shall be residents of the city of Washington and the other four shall be inhabitants of some State, but no two of them from the same State."

There were changes in the personnel of the board during the year, as follows: Senator Charles S. Thomas to succeed Senator William

J. Stone, died April 14, 1918; Representatives Lemuel P. Padgett and Frank L. Greene to succeed Ernest W. Roberts and James T. Lloyd whose terms expired December 26, 1917. The roll of regents on June 30, 1918, was as follows: Edward D. White, Chief Justice of the United States, Chancellor; Thomas R. Marshall, Vice President of the United States; Henry Cabot Lodge, Member of the Senate; Charles S. Thomas, Member of the Senate; Henry French Hollis, Member of the Senate; Scott Ferris, Member of the House of Representatives; Lemuel P. Padgett, Member of the House of Representatives; Frank L. Greene, Member of the House of Representatives; Alexander Graham Bell, citizen of Washington, D. C.; George Gray, citizen of Delaware; Charles F. Choate, jr., citizen of Massachusetts; John B. Henderson, citizen of Washington, D. C.; (Charles W. Fairbanks, of Indiana, died June 4, 1918, vacancy not filled at close of fiscal year) and Henry White, citizen of Maryland.

The board held its annual meeting on December 13, 1917. Mr. Henry White was elected a member of the executive committee to fill the vacancy caused by the resignation of Mr. Ernest W. Roberts, whose term of office would expire on December 26, 1917. The proceedings of that meeting, as also the annual financial report of the executive committee, have been printed, as usual, for the use of the regents, while such important matters acted upon as are of public interest are reviewed under appropriate heads in the present report of the secretary. A detailed statement of disbursements from the Government appropriations under the direction of the Institution for the maintenance of the National Museum, the National Zoological Park, and other branches will be submitted to Congress by the secretary in the usual manner in compliance with the law.

GENERAL CONSIDERATIONS.

The routine operations of the Institution and its branches were carried on as usual during the year, but a number of activities were held in abeyance until after the war. The time and energy of members of the scientific staff were devoted, as far as practicable, to researches bearing on the effectiveness of certain devices and materials for the Army and Navy, and 24 employees were granted furloughs to enter active military service.

Through my connection with the National Research Council and other commissions and boards I have been able personally to render some war service to the Government.

The work of the National Advisory Committee for Aeronautics, of which the secretary of the Institution is a member and chairman of the executive committee, has greatly broadened. At its suggestion the Council of National Defense appointed a committee, now known

; the Aircraft Board, to consider all questions of aircraft produc- on and to make recommendations to the military departments for ıe production and purchase of aircraft and aircraft appliances. The xperimental laboratory of the advisory committee has been erected t Langley Field, near Hampton, Va.

The original Langley man-carrying flying machine has been brought ack from Hammondsport, after several successful flights, and is ex- ibited in the National Museum. This is the first heavier-than-air ıan-carrying machine built, although it did not have a successful ight until more than 10 years after its construction. It is also an im- ortant historical relic, as it confirms the claim that Secretary Langley 'as the first to design and construct a heavier-than-air machine capa- le of carrying a man in flight. There has never been any question hat he was the first to successfully fly a heavier-than-air machine ropelled by its own power.

In February the War Department allotted to the Smithsonian nstitution the sum of $10,000 for experimental work in aviation in onnection with the Signal Corps, which work is being successfully arried on. Upon the invitation of the War Industries Board, Ir. C. G. Gilbert, of the National Museum, was appointed a member f the Joint Information Board of Minerals and Derivatives, in vhich capacity he has done work of unusual value. In April the Secretary offered to the Government the services of Dr. Aleš Irdlička, who has since prepared important reports upon eth- ıography for the National Research Council and for a congressional ommittee of investigation into the effect of language on nationality.

The Smithsonian chapter of the Red Cross has done commendable rar work. Early in the year an ambulance was given for service in Russia and later the funds were raised to defray for one year the xpenses incidental to the maintenance of a bed in the American Red Cross Hospital at Neuilly.

Bequests.—Among the bequests to the Museum during the past ear is that of Miss S. J. Farmer, who willed to the Museum all the emaining models of her father, Moses G. Farmer, inventor of elec- rical apparatus.

The Institution has been made the residuary legatee of the estate f Rev. Bruce Hughes, of Philipsburg, Pa. (died March 20, 1916), nder the following terms of his will probated March 27, 1916:

> All the balance and residue of my estate of which I may die seized shall be aid to the Smithsonian Institute of the city of Washington, District of Colum- ia, the sum to be invested and the income alone used to found the Hughes lcove of the said Smithsonian Institute.

The final share of the Institution in the estate has been estimated t about $11,500. It is proposed that the "alcove" referred to in he will shall be established in and as a part of the National Gallery of Art and that the fund be devoted to the amassing of a reference library of art works.

Gifts.—Dr. Frank Springer has given the Institution the title and custody in perpetuity of his large collection of fossil crinoids and related groups of Echinoderms and has arranged for a fund of $30,000, the income of which is to be devoted to the administration of the collection.

Dr. W. L. Abbott has continued his generous gifts of collections and his support of an expedition in the Celebes under H. C. Raven.

FINANCES.

The invested funds of the Institution consist of the following:

Deposited in the Treasury of the United States under authority of Congress	$1,000,000.00

CONSOLIDATED FUND.

Brooklyn Rapid Transit 5 per cent notes due July 1, 1918, cost	$5,040.63
Province of Manitoba 5 per cent gold debentures due April 1, 1922, cost	1,935.00
American Telephone and Telegraph Company 4 per cent collateral trust bonds due July 1, 1929, cost	15,680.00
West Shore Railroad Co. guaranteed 4 per cent first mortgage bonds due January 1, 2361, market value	37,275.00
	59,930.63
Excess cost of bonds redeemed at part	93.75
Total	1,060,024.38

The combined interest bearing investments, aggregating $1,060,024.38, are represented by the following funds:

Smithson fund	$728,291.00
Habel fund	500.00
Hamilton fund	2,500.00
Hodgkins general fund	153,275.00
Hodkins specific fund	100,000.00
Rhees fund	627.00
Avery fund	24,020.38
Addison T. Reid fund	11,672.00
Lucy T. and George W. Poore fund	27,965.00
George K. Sanford fund	1,174.00
Chamberlain fund	10,000.00
Total	1,060,024.38

One piece of improved real estate in the District of Columbia, bequeathed to the Institution by the late Robert Stanton Avery, was sold during the year; the net amount realized from this sale was $8,721, which amount has been invested in bonds forming a part of the Consolidated Fund.

The practice of investing surplus funds in certificates of deposit paying 3 per cent per annum has proved most satisfactory; the income from this source amounting to $1,275 during the year.

Instead of investing all surplus cash in certificates of deposit, the Instiution purchased $10,000 of the United States Third Liberty Loan, which will be carried on the books temporarily as a special asset and later will be transferred to the Consolidated Fund.

The income of the Institution during the year, amounting to $165,135.02, was derived as follows: Interest on permanent investments and other sources, $63,552.02; repayments, rentals, publications, etc., $13,503.13; contributions from various sources for specific purposes, $24,358.87; bills receivable, $55,000; proceedings from sale of real estate, $8,721.

Adding the cash balance of $9,232.56 on July 1, 1917, the total resources for the fiscal year amounted to $174,367.58.

The disbursements, which are given in detail in the annual report of the executive committee, amounted to $173,077.68, leaving a balance of $1,289.90 in cash and on deposit in the Treasury of the United States and in bank.

In addition to the above disbursements by the Institution, there was included under the general appropriation for printing and binding an allotment of $76,200 to cover the cost of printing and binding the Smithsonian annual report and reports and miscellaneous printing for the Government branches of the Institution.

The Institution was charged by Congress with the disbursement of the following appropriations for the year ended June 30, 1918:

International exchanges	$35,000.00
American ethnology	42,000.00
International catalogue of scientific literature	7,500.00
Astrophysical observatory	13,000.00
Observations, eclipse of the sun of June 8, 1918	2,000.00
National Museum:	
Furniture and fixtures	25,000.00
Heating and lighting	46,000.00
Preservation of collections	300,000.00
Building repairs	10,000.00
Books	2,000.00
Postage	500.00
National Zoological Park	100,000.00
Increase of compensation (indefinite)	
Total	583,000.00

RESEARCHES AND EXPLORATIONS.

The researches and explorations by the Institution were greatly limited in their scope during the past year on account of war conditions. There was unusual activity, however, by members of the scientific staff in investigations which related to the operations of the Army and Navy, and it is believed that the results have been of great benefit to the service.

Several biological and ethnological expeditions to various parts of the world have been held in abeyance, although some already in the field have continued in operation on a limited scale. It is expected that after the war there will be greater activity in these lines than ever before.

Accounts of some of the more important researches are given here and others are reported upon in the Appendix.

GEOLOGICAL WORK IN THE ROCKY MOUNTAINS.

Geological field work has been carried on by me in the Rocky Mountains for several years past, particularly in the study of Cambrian and pre-Cambrian formations. The more important results of this work have been described in my paper on "Evidences of Primitive Life" in the Smithsonian Report for 1915 and in various pamphlets of the Institution. Investigations during the summer and early fall of 1917 were carried on at the now well-known "Burgess Pass" fossil quarry, discovered by me in 1910. Fifty days were spent at the Burgess Pass camp, 3,000 feet above Field, British Columbia, where a section in the quarry of about 180 square feet was taken out. This practically exhausts a quarry which has given the finest and largest series of Middle Cambrian fossils yet discovered and the finest invertebrate fossils yet found in any formation in any country. More than one and a half tons of specimens were trimmed out at the quarry, carried by pack horses to camp, and thence by rail to Washington.

A few days were taken to verify a geologic section near Lake McArthur, and then the Vermilion River trip was begun. Following down the Bow River, we crossed to the south side near Mount Castle and camped at Vermilion Pass. Lower down the valley on the eastern side near the mouth of Ochre Creek, Syncline Peak shows remnants of the compression and folding that accompanied the uplift of the mountain massif, now cut by erosion into hundreds of mountains, ridges, and canyons.

From Vermilion River the party followed a new forest ranger trail up Tumbling Brook to a small, beautiful glacier beneath the great eastward facing cliffs of Gray Peak.

Wolverine Pass is a broad, rolling area at about timber line. On its southwestern slope the northeast branch of Moose Creek begins, on the north slope the headwaters of Ochre Creek, and on the southeast the drainage is to Tumbling Brook, a branch of Ochre Creek. The views from the upper slopes northeast of the Pass are among the finest in the Canadian Rockies. Mount Drysdale, on the right, ises 2,200 feet above the Pass, and Mount Gray, on the left, 1,800 eet, the altitude of the Pass being 7,200 feet. Tumbling Glacier, n the left of Mount Gray, is formed from snows blown over the liffs from the westward. On the right of Mount Drysdale the eastrn side of the great Washmawapta snow field may be seen; in the istance, through the Pass, the dark Beaverfoot Range, and beyond , in the extreme background, the snowy peaks of the Selkirk Ranges.

A late September storm drove us back from Wolverine Pass to the ermilion River, where below Ochre Creek a search was made for oose. On October 1 a great bull, a cow, and young were brought own and their skins, skulls, and horns secured for the National useum collections.

RESEARCHES ON THE STRUCTURE OF THE TRILOBITES.

In my laboratory work for the past 45 years I have been on the atch for evidence bearing on the structure and organization of ossil trilobites. The study of a small and unique series of speciens secured at Burgess Pass since 1910 has so greatly increased ur knowledge of these interesting animals that a special paper, acmpanied by 28 plates of illustrations, is now in press, to appear in e Smithsonian Miscellaneous Collections.

GEOLOGICAL WORK IN THE APPALACHIAN AND OHIO VALLEYS.

During the summers of 1916 and 1917 Mr. Frank Springer connued his researches upon the fossil echinoderms of the Ohio Valley ith a view to obtaining further material and information for the mpletion of a monograph upon the Silurian crinoids of that area hich he has now in preparation. His assistant, Dr. Herrick E. ilson, collected in the vicinity of St. Paul and of Madison, in ndiana, proving for the first time the presence in the latter locality f the crinoidal faunas of both the Waldron and the Laurel formaons. One object of the present field investigation is to obtain rther light on the relations of the Silurian faunas of the Chicago nd southern Indiana areas with those of western Tennessee. Mr. pringer acquired by purchase all the echinoderms in the large colction of Mr. John F. Hammell, of Madison, Ind., which included at made by A. C. Benedict from the Indiana Silurian, containing e types of a considerable number of species. This material has en added to his collection of fossil echinoderms now deposited in e National Museum.

GEOLOGICAL WORK IN MARYLAND.

Dr. Bassler, of the division of invertebrate paleontology in the ational Museum, reports that, in company with Assistant Curator r. C. E. Resser, he made some investigations in the Frederick and

Hagerstown valleys of Maryland with the object of securing for the exhibition series large examples illustrating the various types of conglomerate. Two fine, large masses of the well-known Triassic limestone conglomerate were obtained with little difficulty, but equally good examples of the siliceous variety were secured only after much hard labor, owing to the ready disintegration of the rock on exposure. Efforts were finally successful, however, and there was also secured a mass of the so-called " edgewise " conglomerate several feet in diameter, which will well illustrate the phenomenon of intraformation conglomerate described by me a number of years ago. This last was obtained where the steeply dipping lower Ordovician beds outcropped in such a manner that the desired material could be blasted without fracturing. All of such conglomerates are the result of ancient mud deposits of tidal flats becoming sun cracked when exposed to the air. The dried edges of the sun-cracked areas become tossed about by the wind and the fragments finally accumulate in layers which ultimately are hardened into rocklike conglomerate. Conglomerates usually indicate the base of a formation, but this particular kind may occur at any place within a formation, whence I applied the specific name " intraformational " to them.

GEOLOGICAL WORK IN CENTRAL KENTUCKY.

After the conclusion of geologic work in the Appalachian Valley in the early summer of 1917, Dr. Bassler proceeded to central Kentucky, where he spent several weeks in explorations for suitable exhibition specimens covering the general subject of stratigraphic paleontology. It was especially desirable that such phenomena as stratification, the occurrence of fossils, and unconformities should be illustrated in the Museum, and especial efforts were made to secure specimens exhibiting these features. Much discrimination was necessary in the selection of these objects, as it was essential to obtain specimens of such size as to be appreciated by the public and still not too large for the available space, which is somewhat limited. This difficulty complicated the work, but the selection finally made was extremely satisfactory. In his account of the work Dr. Bassler says:

> The early Paleozoic coral reef near Louisville, Ky., from which a section 6 by 10 feet in dimensions had been quarried and placed on exhibition during the summer of 1916, was revisited and several additional layers of highly fossiliferous shale and limestone were secured. These have now been added in their proper position to the coral-reef mount, so that this single exhibit now illustrates the subjects of stratification in general, horizontal strata, change of lithology from limestone to shale, the occurrence of fossils in these types of sediment, and the phenomenon of fossil coral reefs for which the exhibit was primarily planned.
>
> The most valuable result of the summer's work was achieved at Elkin, Ky. Here a single limestone slab, 6 feet long and several feet wide and thick, show-

ng an unconformity distinct enough to be appreciated by the layman, was uarried out and shipped to the museum without breakage, where it now forms most instructive exhibit. The outcropping limestone ledge, several feet in hickness, is composed of a distinctly white lower portion and a dark-colored pper part, the head of the hammer marking their line of contact. This line lso marks an unusually clear unconformity. Both of these layers are rich n fossils, those of Early Black River (Lowville) age occurring in the lower white rock and those of Early Trenton in the upper dark material. Since at ther places in the United States 500 or more feet of strata of Middle and ate Black River age intervene between these two layers, it is shown that Kentucky was a land area during the deposition of the Middle and Upper Black River strata. This is also evidenced by numerous worm burrows extending downward from the top of the white limestone. When the material was in the condition of soft mud and exposed at the surface, the worms burrowed into it, as they do in the soil to-day.

The phosphate localities near Wallace, Ky., were next visited, in order to obtain illustrations of the gradual phosphatization of limestone and the types of fossils in phosphatic strata. Here it was discovered that phosphate rock occurs only along the joint planes of the limestone. Surface water passing along these joint planes leaches out the calcium carbonate of the phosphatic limestone, leaving the calcium phosphate content behind.

GRASSES OF THE ADIRONDACK AND WHITE MOUNTAINS.

During the month of August, 1917, Mr. A. S. Hitchcock, systematic grostologist in the Department of Agriculture and custodian of the section of grasses of the division of plants in the United States National Museum, visited the Adirondacks in New York and the White Mountains in New Hampshire for the purpose of studying their flora, specially the grasses of the alpine summits. Mr. Hitchcock reports s follows:

In the Adirondacks headquarters were at Lake Placid, from which point excursions were made to the summits of Whiteface and McIntyre, the highest peaks in the group with the exception of Mount Marcy. It was impracticable to reach Mount Marcy without the use of a camp outfit. This peak rises to a height of 5,344 feet, but Mount McIntyre is nearly as high (5,112 feet). Both McIntyre and Whiteface extend above the timber line and support at the summit an alpine flora.

The White Mountains reach a somewhat greater altitude than the Adirondacks, Mount Washington, the highest peak, being 6,293 feet. In the Mount Washington group there are several peaks whose summits are above the timber line. The alpine flora of these peaks and of the peaks of the Adirondacks are similar, and include plants that farther north are found at a lower altitude or, in the Arctic regions, even at sea level.

Four days were spent investigating the flora of the peaks. The ascent was commenced at Crystal Cascade on the east side, whence the trail led up Tuckerman Ravine to the Summit of Mount Washington, thence down to Lakes-of-the Clouds where there is an Appalachian Mountain Club hut for the accommodation of climbers. From here the head of Oakes Gulf was explored. The second day was spent along the trail from Lakes-of-the-Clouds to the Mount Madison hut, going by the way of the Westside and Gulfside trail, which passes near the high peaks of Clay, Jefferson, and Adams. The return trip to Lakes-of-the

Clouds hut was made on the third day, descending 3,000 feet through the Great Gulf by the Buttress trail and ascending again by the Six Husbands trail to the Alpine Meadow. On the fourth day the descent was made by way of Huntington Ravine over a little-used and difficult trail.

There are nine species of grasses that may be considered to be alpine. A few others extend from the lower zones into the alpine region. Most of the alpine species are circumpolar and extend southward in the mountains, one to the high peaks of western North Carolina and two through the Rocky Mountains even in South America. One species, Poa laxa, is abundant on the upper cone of Mount Washington, extending quite to the summit, and comprises almost the only vegetation of this area. This is a European species which is found in North America only in the region of Mount Washington and on a few of the higher peaks of New England.

The forest flora of the mountains consists mainly of white pine, white spruce, larch, aspen, and white birch. Toward the summits of the peaks the dominant tree is the balsam fir, which near timber line becomes a straggling shrub.

ANTHROPOLOGICAL STUDIES ON OLD AMERICAN FAMILIES.

In continuation of his researches on old American families, Dr. Hrdlička, of the National Museum, in 1917, visited Yale, Virginia, and Harvard Universities. The last two were visited on the occasion of the "Teachers' Course," which brings to these institutions many adult individuals of old American parentage from a large territory. The total number of subjects examined, mainly for pigmentation of hair, and eye and skin color, amounted to over 1,000, all of whom were Americans of at least three generations on both the paternal and maternal sides of the family. Dr. Hrdlička says:

> The results which are now being elaborated for a report are of uncommon interest. They show a number of important facts of which we had no previous reliable knowledge. One of these is, in brief, that there is no increase in the proportion or grade of pigmentation as we proceed from New England southward, and no increase in blondness as we proceed northward from the Carolinas and Virginias. Another striking result shows that there are localized peculiarities in pigmentation, especially that of the hair, but that in every case these can be traced to the ancestry rather than to the environmental conditions. The latter nevertheless appear to have been active in general in reducing the total proportions of blondness.
>
> So far as the color of the eyes is concerned there were found unexpectedly, in all the areas, a large proportion of "mixed" colors; in other words, eyes in which more or less marked traces of brown coexist with various shades of blue, green, or gray.
>
> Three cases were encountered in which the color of the two eyes was markedly different. Pure beautiful blues and browns were few in number.

THE MOUNTAINEERS OF TENNESSEE.

During the latter part of July, 1917, Dr. Hrdlička made a trip to eastern Tennessee, for the purpose of becoming acquainted with the characteristics of the population of these regions, which in large part is of old American stock but has long existed under disadvantageous environment, remaining as a result backward in education and in other respects. He reports as follows on the results of his studies:

> The work commenced at Bristol, Tenn., extended to Mountain City, and farther on into the hills; and its success was very largely due to the kind offices and direct personal help of an old friend of the Smithsonian Institution, Mr. Samuel L. King, of Bristol. For additional help the writer is indebted to Mr. John Caldwell, of the same city.
>
> The work extended mainly to the men called for examination by the first draft for the United States Army, and comprised 150 individuals. Both measurements and observations were taken. Some of the men came from the lower lands of the Bristol district and were kept apart, but a good number represented the real mountaineers.
>
> It is too early to speak of the results of this interesting piece of research, the data not having as yet been properly reduced and analyzed; but it is safe to say that these mountaineers represent no separate type of Americans. In many cases they still show strong indications of their respective pre-American ancestry. Among the men there were seen some fine examples of physique—willowy, clean-cut six-footers; but there were also others of rather feeble mental powers or nervous stability, which conditions, to some extent possibly, are due to hereditary effects of alcoholism or to defective heredity of other nature.
>
> The families of the mountaineers are remarkable in many cases for their arge size, and there were seen examples of longevity and virility which it would be hard to find in our cities.
>
> There are all grades of "mountaineers" and no line of demarcation separates hem from the people in the lower lands, who are mostly of similar derivation nd sometimes of the same families. But as one proceeds into the wilds of the mountains the population becomes sparser and more backward, the cultivated patches of ground smaller in area, and the habitations poorer, until some of the atter come to resemble the shacks of the southern negro.
>
> The poorer class of mountaineers frequently show characteristics partly due o their backwardness in education and their isolation and partly, perhaps, to hookworm disease or other abnormal conditions. Some of the young men are ypes of slouchiness, such as would delight the artist, while the women disfigure hemselves by chewing snuff and frequently show uncouthness in dress, movements, and behavior. But the people are hospitable and interesting. In the course of a short ride of less than 2 miles through a sparsely settled gorge the writer and his local companion had no less than four invitations to lunch—in he other places there was no one at home. Their language and intonation are characteristic and quaint, and the people seem to be full of old and local folkore, the study of which would probably prove most delightful. Being largely dependent on themselves and their few neighbors, they have also many antiquated and strange curative practices which would repay investigation.
>
> Their worst enemies are the isolation, "moonshine" whisky, and, in not a few cases, undoubtedly a poor heredity. The Army draft will be a godsend to many of the young men, some of whom can not even read or write; but probably few of those who will return will remain mountaineers.

THE VANISHING INDIAN.

Through the cooperation of the Institution and the American Association for the Advancement of Science, Dr. Hrdlička in August, 1917, made some interesting investigations of the Shawnee and other Indian tribes. Concerning his work he says:

> The progress of miscegenation among many of the Indian tribes has progressed to a degree that is surprising even to those who for many years have been studying the Indian. While the total number of " Indians " as recorded by the census increases from decade to decade, the fact is that this increase is due wholly to that of mixed bloods; the full bloods of pure strain in most localities are rapidly disappearing and in a considerable proportion of the tribes have become actually extinct or are on the point of extinction.
>
> Two remarkable examples of this fact have just been experienced by the writer. For years a growing necessity in American anthropology has been to determine the physical type of the Shawnee, once a large tribe and one of considerable historic importance. No great difficulty was apprehended in this task, as the tribe is still well represented. The most promising part of the tribe was that of the so-called "absentee" Shawnee, on the Shawnee Agency in eastern Oklahoma. They count 569 individuals, quite a few of whom are generally regarded as " full bloods." To his great disappointment the task of finding some pure bloods became exceedingly difficult. Quite a few of the Indians were found to be " full bloods," but on inquiry into the family history it was generally learned that the subject was a mixture of Shawnee with the Oneida, Delaware, Creeks, or some other tribe. In conclusion, there were found but three individuals who so far as they or their friends knew were full-blood Shawnee. Two of these were old women and one an old man, all near or over 70 years of age, and two of the three were sister and brother.
>
> The next tribe visited was the Kickapoo, the main body of which to the number of 211 is settled about McLoud, Okla. They were said by the old Shawnee to be practically the same people as themselves, having at some time in the past had but one camp fire, and it was generally believed that they would show some full bloods of pure strain. This proved to be a vain hope. On close inquiry all sorts of mixtures were discovered, even among the oldest men and women of the tribe, but no pure bloods. Only one single woman of middle age was believed to be possibly a full Kickapoo, but there was no real certainty. Some visiting Kickapoo from Mexico proved no better than the rest, and no hope was given that any pure strain Kickapoo could be found anywhere else.
>
> Thus two tribes, one of which of considerable importance, may be regarded as lost to science, so far as pure bloods are concerned. Only a few years ago, according to local information, there were still a number of old men and women living in both tribes who represented the pure strain. The genuine Indian is rapidly passing away and the work of the anthropologist who endeavors to record the physical type of the various tribes is becoming increasingly difficult.

ETHNOLOGICAL EXPLORATIONS IN COLORADO AND UTAH.

One of the most important results of field work by the Bureau of American Ethnology during the past year was the investigation of little-known towers, castles, and great houses in southwest Colorado. In conjunction with the Department of the Interior, the Smithsonian Institution has been engaged for a decade in the excavation and repair of large ruins situated on what is called the Mesa Verde National Park. The educational value of this work can hardly be overestimated, and in recent years over 2,500 people have visited the locality yearly to see these largest of all prehistoric ruins in our Southwestern States. In his field work during the summer of 1918 Dr. J. Walter Fewkes, Chief of the Bureau of American Ethnology, investigated equally instructive groups of ruins in the valleys in sight of the Mesa Verde Park and found there many well-preserved buildings of which little has been hitherto known; the most striking of these were finely constructed towers, castles, and great houses, the walls of which have fine masonry, rising in some instances 25 feet high. They may be instanced as the best-preserved examples of Indian stone houses north of Mexico. Three clusters of these remarkable constructions in southwestern Utah are specially noteworthy, containing in all 11 different buildings, the majority of which are still, after centuries of wear, in nearly the same condition as when deserted by the aboriginal builders. Many evidences of their prehistoric character were gathered. The name of the race to which their builders belonged is no longer known, but the memory of them still survives in dim legends of descendants living many miles away. A visit to these towers well supplements one to the Mesa Verde, and broadens one's knowledge of the variety of buildings which stood in the desert during the most flourishing epoch of North American architecture of the past. As a sequel to the explorations carried on by the Smithsonian in these remarkable monuments, the Director of the Public Park Service of the Department of the Interior, recognizing their educational value for scholars and tourists, has taken steps to have them set aside from the public domain and placed under the care of the Superintendent of the Mesa Verde Park for permanent preservation.

NATIONAL PARKS EDUCATIONAL COMMITTEE.

On June 26, 1918, at a meeting held at the Smithsonian Institution there was organized the National Parks Educational Committee. Dr. Charles D. Walcott, Secretary of the Smithsonian Institution, was chosen chairman, former Representative William Kent, of California, vice chairman, Henry B. F. Macfarland, of Washington, chairman of the executive committee, and Robert Sterling Yard, secretary. The membership includes representatives of universities, institutions, and public-spirited associations East and West, through whose cooperation it will present a front of many influential units.

The need of this organization grew out of the rapid growth of public interest in our national parks, due to the recent realization of their supreme qualities. It is a safe statement that there is no other cause so popular in America to-day that is not a war cause. The limitation of governmental functions practically to the physical development of the national parks leaves the gathering of their enormous potential harvests of education and appreciation to the people themselves; it is to organize these departments of higher enjoyment, to give impetus to the art and literature of outdoors, to popularize natural science, and to encourage outdoor living that the committee is established.

The committee will support a plan of systematic selection and development to secure for American national parks the recognized first place in world scenery, thus realizing their value as a national economic asset. Its educatioal plans are based upon views of national parks as popular classrooms and museums of nature. It will seek the cooperation of public schools and universities in the interpretation of natural scenery in terms of popular science. Among its first acts was the passage of a resolution, offered by Leonidas Dennis, of New Jersey, favoring the bill which has passed the Senate and is now before the House to make the Grand Canyon a national park.

The committee will enlarge itself so as to become representative of every section and State in the country. It is the initial stage in a broad national organization to be perfected after the war under the title of the National Parks Association. The members at present are as follows:

Wallace W. Atwood, department of physiography, Harvard University.

Arthur E. Bestor, president of Chatauqua Institution.

Belmore Browne, explorer, author, artist.

Henry G. Bryant, president Geographical Society of Philadelphia, explorer.

John B. Burnham, president American Game Protective and Propagation Association.

William E. Colby, president Sierra Club.

Leonidas Dennis, conservationist, lawyer.

J. Walter Fewkes, chief Bureau of American Ethnology.

John H. Finley, president University of State of New York.

William B. Greeley, chairman conservation committee Camp-Fire Club.

George Bird Grinnell, Boone and Crockett Club, pioneer of Glacier National Park.

William H. Holmes, curator of National Academy of Art, head curator anthropology, United States National Museum.

William Kent, former United States Representative, donor of the Muir Woods National Museum.

George F. Kunz, president of American Scenic and Historic Preservation Society.

E. M. Lehnerts, department of geology, University of Minnesota; pioneer in national parks geology classes.

Henry B. F. Macfarland, publicist; lawyer.

J. Horace McFarland, president American Civic Association.

La Verne Noyes, president board of trustees, Chicago Academy of Science.

George D. Pratt, conservation commissioner, State of New York; president Camp Fire Club.

D. W. Roper, director Prairie Club; engineer.

Edmund Seymour, president American Bison Society.

Charles Sheldon, Boone and Crockett Club; explorer, author.

ohn Dickinson Sherman, conservation chairman, General Federation
i's Clubs.
D. Walcott, secretary Smithsonian Institution.
Sterling Yard, Chief Educational Division, National Park Service.

PUBLICATIONS.

nstitution and its branches published during the year 91 and separate pamphlets. The total distribution was 134,284 which included 1,591 volumes and memoirs of Smithsonian tions to Knowledge, 26,412 volumes and separates of the nian Miscellaneous Collections, 19,815 Annual Reports and papers, 75,300 volumes and pamphlets of Museum Pro-, 7,344 Bureau of American Ethnology publications, 2,929 ublications, and others relating to the Astrophysical Obser- the Harriman Alaska Expedition, and the American His- ssociation.

onditions naturally greatly delayed the issuance of publica- the Government Printing Office, so that there is a large ation of material in proof and manuscript awaiting com-

nents for printing.—The allotments for the printing of the nian Report and the various publications of the branches of itution were practically used up, a small balance remaining or two cases owing to the impossibility of getting certain ions off the press before the close of the year.

llotments for the year ending June 30, 1919, are as follows:

Smithsonian Institution: For printing and binding the annual of the Board of Regents, with general appendices, the editions h shall not exceed 10,000 copies	$10,000
nnual reports of the National Museum, with general appen- nd for printing labels and blanks, and for the bulletins and lings of the National Museum, the editions of which shall not 4,000 copies, and binding, in half morocco or material not xpensive, scientific books, and pamphlets presented to or ac- by the National Museum library	37,500
nnual reports and bulletins of the Bureau of American Eth- and for miscellaneous printing and binding for the bureau	21,000
ellaneous printing and binding:	
national exchanges	200
national Catalogue of Scientific Literature	100
nal Zoological Park	200
physical Observatory	200
nnual report of the American Historical Association	7,000
tal	76,200

ittee on printing and publication.—The Smithsonian ad- ommittee on printing and publication considers all manuscripts offered for publication by the Institution or its branches. During the past year 13 meetings were held, at which 68 manuscripts were considered and acted upon. The membership of the committee is as follows: Dr. Leonhard Stejneger, head curator of biology, National Museum, chairman; Mr. N. Hollister, superintendent of the National Zoological Park; Mr. A. Howard Clark, editor of the Institution, secretary of the committee; Dr. George P. Merrill, head curator of geology, National Museum; and Dr. J. Walter Fewkes, chief of the Bureau of American Ethnology, who succeeded Mr. F. W. Hodge, resigned.

LIBRARY.

The library of the Smithsonian Institution is divided into (1) the main library, consisting chiefly of journals and transactions of learned societies and institutions throughout the world, which are in the custody of the Library of Congress and administered as the Smithsonian deposit; (2) the National Museum library; (3) the library of the Bureau of American Ethnology; (4) the National Zoological Park library; (5) the library of the Astrophysical Observatory; and (6) the office reference library. Some of these are subdivided into several sectional libraries.

The report of the assistant librarian in the appendix presents details of accessions. Mention should here be made of one exceptional and important addition to the Museum library, consisting of a large number of botanical and horticultural publications brought together at Biltmore, N. C., by the late Mr. George W. Vanderbilt and presented by Mrs. Vanderbilt.

NATIONAL MUSEUM.

The detailed account of the operations of the National Museum is recorded in an appendix to this report by Mr. Ravanel, the administrative assistant who had chiefly conducted the affairs for several months during the illness of Assistant Secretary Rathbun, whose death occurred shortly after the close of the fiscal year. It is therefore unnecessary here to do more than to review some of the principal activities of the Museum and to refer to the appendix for further information.

The exhibits are now housed in three buildings: (1) the arts and industries collection in what is known as the old Museum building, (2) the natural history collections and the National Gallery of Art in the large new building, and (3) the graphic arts and National Herbarium in the original Smithsonian building.

During the year 69,286 square feet of room in the Natural History Building were turned over to the Secretary of the Treasury for use of about 3,000 clerks of the War Risk Insurance Bureau. I may mention here that a few weeks after June 30 the building was closed to the public, the exhibition cases were crowded into the least possible quarters, and all available space was temporarily given over to the Insurance Bureau. This course was gladly taken, in order to put into immediate effect the financial assistance provided by Congress for the families of our soldiers and sailors.

About 1,300 accessions to the Museum were recorded during the year, aggregating nearly 143,000 specimens and objects, including 11,000 pertaining to the department of anthropology, 61,500 to zoology, 38,000 to botany, 11,300 to geology and mineralogy, and 17,900 to paleontology; 168 paintings and other art objects were lent for exhibition in the gallery of art.

Among the most interesting additions of anthropological objects were over 400 specimens from Celebes, East Indies, illustrating agriculture and household economy in that region collected through the generosity of Dr. W. L. Abbott. A collection given by Mr. Alfred M. Erskine represented implements and costumes of the Dyaks of Borneo. A noteworthy addition to the division of American archeology was a collection of 83 specimens, mostly stone implements, also relics from the cliff and cavern dwellings of New Mexico, Indian relics from the Virgin Islands, and a large number of relics from Utah. By an exchange with the Royal Ontario Museum of Toronto there were acquired about 200 specimens of Babylonian tablets and prehistoric stone implements from Egypt, France, and England.

The division of mechanical technology was enriched by the addition of a large number of firearms and firearm appliances. Among the historical objects received were two flags pertaining to the present war, one of which belonged to *Zeppelin 49* at the time of its capture in 1917; the other was the flag used at the funeral of the American soldiers lost on the transport *Tuscania* in 1918. A most interesting object is the original letter written by Gen. Grant demanding the unconditional surrender of Fort Donelson. There are also large numbers of souvenirs of American soldiers and statesmen, among which may be mentioned a number of personal relics of Maj. Gen. George B. McClellan, United States Army, consisting of swords, uniforms, and other objects owned by him during the Mexican and Civil Wars; also the well-known Robert Hewitt Collection of Medallic Lincolniana made up of some 1,200 medallions, medals, tokens, and badges. To the collection of musical instruments were added five American pianos and one organ, seven English pianos, two Austrian grand pianos, and a number of other instruments. To the numismatic collection was added a large number of replicas of United States service medals and to the collection of philatelic material, 3,186 stamps, 2,706 of which were received from the Post Office Department. In the appendix the administrative assistant enumerates important additions in the departments of anthropology, biology, geology, and to the arts and industries collections which need not be repeated here.

In previous reports I have called attention to the rapid development since 1912 of the collection of textiles, woods, and medicines. The additions to the collection, showing the methods of making textiles and finished products, are must instructive, likewise the collection of materia medica, which has been largely increased.

The division of mineral technology during the year has published a number of unusually important pamphlets on the minerals of the United States, power, petroleum, nitrogen, and coal. Some interesting objects added to the exhibits in the division include models showing the occurrence and recovery of gold and the manufacture of lead and exhibits of coal-tar products.

The construction of the building for the Freer collection has progressed as rapidly as could be expected under present war conditions. The exterior walls have been erected to entablature height. Nine hundred and twenty-eight items have been added to the Freer collection, including 159 oriental objects. The National Gallery of Art received a bequest comprising 12 paintings, a number of miniatures and other objects, 140 items in all, from the estate of Mrs. Mary Houston Eddy, to be known as the A. R. and M. H. Eddy donation. It has also received from the Russian artist, Ossip Perelma, a portrait by himself of M. Boris Bahkmeteff, first ambassador of the Russian Republic to the United States.

The number of visitors to the Natural History building during the year 1917 aggregated 306,003 on week days and 95,079 on Sundays, and to the Arts and Industries building the number was 161,298. The number of visitors to the old Museum building since it was opened to the public in 1881 has been 8,000,000; to the new building since 1909, 2,643,654; and to the Smithsonian building since 1881, 4,734,492. Many meetings of various scientific societies were held in the Museum auditorium during the year. Special exhibits have also been shown, among the most interesting of which were the collection illustrating the united organizations of the United States Food Administration and the exhibit of etchings of war industries by Pennell.

Following the custom of many years there was a distribution of some 8,000 duplicate specimens to schools and colleges for educational purposes, all properly classified and labeled. These included sets of mollusks, ores, minerals, and objects of ethnology and archeology.

The Museum publications of the year comprised 6 volumes and 40 separate papers, including the annual report for 1916, volume 51 of the Proceedings, and 5 bulletins. Bulletin 102, on the mineral industries of the United States, is of particular interest to the public, e four parts so far issued being devoted to coal products, fertilizers, lphur, and coal.

Additions to the Museum library amounted to 3,230 volumes and 571 pamphlets, making the present aggregate of 52,534 volumes and ,491 pamphlets and unbound papers. To the Biltmore collection f botanical works, presented by Mrs. George W. Vanderbilt, 2,000 olumes were added.

BUREAU OF AMERICAN ETHNOLOGY.

The activities of the Bureau of American Ethnology are limited o the study of the past and present conditions of the North Meran Indians. Their main purpose is to perfect the existing classificaions of the various stocks of these aborigines based on their language n order to discover their relationship, and to gain a clearer insight nto the origin, history, and migration of man on this continent. The languages of the Indians are doomed to disappear in the near uture; some have already gone and others will become extinct in a few years. Through intense, patient research the bureau is underaking the task of recording these vanishing tongues before they disppear forever.

The bureau is also, through archeological work, resurrecting from the night of the past hitherto unrecorded chapters of the history of aboriginal Indian life that reached a high development and disappeared before recorded history began. One evidence of a prehistoric phase of Indian life is indicated by the pueblos and cliff dwellers. Through erosion by the elements and vandalism due to man these remarkable houses are rapidly falling into decay. The Bureau of Ethnology is cooperating with the Department of the Interior in the excavation and repair of these remains in order that they may be of educational value and preserved for posterity.

The field researches of the bureau the past year have been particularly important, both from ethnological and historical points of view. Hitherto unknown prehistoric monuments have been discovered and surveyed, while others previously known have been excavated and permanently preserved. The advances made in ethnological knowledge, although often slow, are always important and have opened up new problems pleading for solution, indicating that the work of the bureau has barely begun, and that much available information regarding our aborigines still remains to be gathered.

NATIONAL ZOOLOGICAL PARK.

Increasing popular interest in the Zoological Park is manifest by the number of visitors, which aggregated 1,593,337 in 1918 as compared with 564,634 in 1909 and 633,526 in 1913. The park is an educational center as well as a place of resort for recreation and pleasure. This is shown by the fact that 78 schools and classes visited the park in 1918, with a total of 4,945 individuals. It is likewise a center for the life-history study of animals, for they are placed as nearly as practical in conditions of their natural environment, and as the collection increases in numbers or in kinds so does its value become of more importance as a source of scientific information.

There is now in the park a total of 1,247 animals, representing 345 distinct species. These include 483 mammals, 706 birds, and 58 reptiles. The several species are enumerated in detail in the superintendent's report in the appendix.

A most interesting recent accession is the first specimen of the glacier bear or blue bear ever known to have been captured alive. It has a very limited distribution in the region of the St. Elias Alps, near Jakutat Bay, Alaska. Being one of the rarest and least known of the great game animals of America, specimens have been eagerly sought for zoological gardens. Among other accessions may be noted keas, or sheep-killing parrots, and some flightless rails from New Zealand, and a large boaconstrictor, 11 feet long, from Trinidad.

For several years I have urged the purchase of certain parcels of land along the western boundary of the park and in 1913 an appropriation was made by Congress for that purpose, but as the purchase could not be completed before the time limit of the appropriation, further legislation becomes necessary for renewal of the allotment.

The superintendent calls attention to a number of important needs, including roads, bridle paths, automobile parking space, grading and filling, a new aviary building, a reptile house, and outdoor quarters for mammals.

A striking mark of the appreciation and interest of the children of Washington in the National Zoological Park is the tablet placed in the elephant house to the memory of the elephant "Dunk," through subscription to a popular fund by the children of Washington, "whose favorite Dunk was for more than a quarter of a century."

ASTROPHYSICAL OBSERVATORY.

The general direction of the work of the Observatory has continued under Dr. C. G. Abbot, who, in addition to these duties, has been occupied during the year with a number of scientific investigations directly connected with the war.

The investigation of the absorption of long-wave rays by long columns of air containing known quantities of water vapor, reference to which was made in my last report, have been continued and the results to date published in the Smithsonian Miscellaneous Collections. In describing his work Mr. Fowle says:

The main purpose of this research was to determine the transparency of ter vapor, under atmospheric conditions, to radiation such as the warm th sends toward space. Upon the absorptive property of water vapor rests part the virtue of the atmosphere as a conservator of the heat which earth receives from the sun. Radiation from the sun reaches the earth's face diminished by a certain portion scattered toward space and certain er portions absorbed in the gases and vapors of the atmosphere. The re-n of the energy of this radiation back to space is an indirect process. The rmed earth is cooled partly by convection currents playing over its surface d partly by direct and indirect radiation through the constituents of its nosphere. Of these the principal hindrances to free radiation are aqueous or and carbonic acid gas.

Mr. Fowle's investigations have fixed the dependence of the trans-ssion of the atmosphere on humidity for all wave lengths up to 17 crons. This covers a region of spectrum about fifty times as long as t which is visible to the eye. At about 17 microns rock salt, which used in preference to glass for optical work on long-wave rays cause glass is opaque, itself becomes opaque. Further progress in e important region between 17 and 50 microns depends on finding new transparent medium. Experiments by Mr. Aldrich have own that potassium iodide is suitable. But hitherto this substance s yielded no crystals bigger than buckshot. Fortunately, new thods devised for war purposes seem likely to furnish large crys-ls of this substance and there is great hope that the investigation atmospheric transparency may soon be carried further.

The total solar eclipse of June 8, 1918, was observed at Lakin, ans., by Mr. Aldrich, of the Observatory, with two assistants. Some od photographs of the solar corona and other phenomena were cured. Throughout the afternoon and early night hours of June and 9 observations were made with the pyranometer. The results measure the gradual dimunition of the radiation of the sun and the brightness of the sky as the eclipse progressed, the outgoing diation of the earth's surface during totality, the gradual increase sun and sky radiation afterwards, their decline toward sunset, d the outgoing radiation from the earth's surface after nightfall."

Investigations at Mount Wilson of the variability of the sun have en continued and improved. Observations were also made at ump Mountain, N. C., but that station was abandoned as too oudy, and in June, 1918, a station believed to be exceptionally well cated was established near Calama in Chile at an altitude of 2,250 eters where meteorological records indicate 300 days per year vorable for solar constant work. This station is supported by a rant from the Hodgkins fund. It is in charge of Mr. A. F. Moore nd is exceptionally well equipped.

INTERNATIONAL EXCHANGES.

The total number of packages handled by the International Exchange Service during the year was 266,946, weighing 182,825 pounds, as compared with 399,695 pounds in 1917, the decrease being due almost entirely to war conditions.

The operations of the exchange service have been somewhat curtailed during the past year by the impossibility at times of obtaining cargo space. This condition and the excessively high freight rates necessitated shipments by mail where this could be done advantageously. Notwithstanding the scarcity of shipping, it is significant that governmental licensing boards for imports and exports, both of this country and of Great Britain, have recognized the importance of keeping open the interchange of scientific information by granting licenses to the Institution and its agents for the transmission of this material. Only three consignments of exchanges have been lost through hostile action since the beginning of the war.

In the interchange of Government publications 91 sets of United States governmental documents were received for distribution to designated depositories in foreign countries.

INTERNATIONAL CATALOGUE OF SCIENTIFIC LITERATURE.

The United States Bureau of the International Catalogue of Scientific Literature is carried on by the Smithsonian Institution by means of a congressional appropriation. The central bureau is in London, where data from regional bureaus are assembled and published in series of annual catalogues. The war has very greatly interfered with this work, some countries being so much in arrears in their contributions toward its support as to necessitate unusually large subscriptions from several institutions.

As its name indicates, the catalogue is made up of bibliographical references to scientific literature in various countries. The United States bureau since 1910 has collected data for this country, aggregating more than 350,000 reference cards. The 17 annual volumes issued in London are sold at an annual subscription price of $85, chiefly to large reference libraries and important scientific institutions, the proceeds covering in part the cost of the publication.

At the international convention in London in 1910 a committee was authorized to secure cooperation with other similar organizations in preparation of the catalogue and to broaden its scope to include technical industries closely allied to researches in pure science. This would not only lead to economy of labor but would provide a uniform reference to the literature of all sciences.

NECROLOGY.

WILLIAM JOEL STONE.

William Joel Stone, A. B., LL. D., United States Senator, regent of the Smithsonian Institution, was born in Madison County, Ky., May 7, 1848, and died April 14, 1918. Mr. Stone was educated at Missouri University, which later conferred upon him the degree of LL. D. He was admitted to the bar in 1869, after which he was successively prosecuting attorney of Vernon County, Mo., Representative in the Forty-ninth, Fiftieth, and Fifty-first Congresses, and governor of Missouri. He was a member of the Democratic National Committee from 1896 to 1904, vice chairman of the committee from 1900 to 1904, and in 1903 was elected to the United States Senate, to which office he was twice reelected. He was regent of the Smithsonian Institution from 1913 until his death.

CHARLES WARREN FAIRBANKS.

Charles Warren Fairbanks, A. B., A. M., LL. D., twenty-sixth Vice President of the United States, regent of the Smithsonian Institution, was born in Union County, Ohio, May 11, 1852; died June 4, 1918. Mr. Fairbanks was educated at Ohio Wesleyan University, was admitted to the Ohio bar in 1874, and established practice at Indianapolis, Ind. He was delegate and chairman in several national political conventions, United States Senator from Indiana from 1897 to 1905, Vice President of the United States from 1905 to 1909. During his term as Vice President he was ex officio regent of the Smithsonian Institution, and was again regent by resolution of Congress from 1912 until his death.

Respectfully submitted.

CHARLES D. WALCOTT, *Secretary.*

APPENDIX 1.

EPORT ON THE UNITED STATES NATIONAL MUSEUM.

Sir: Owing to the death on July 16, 1918, of Mr. Richard Rathbun, ssistant Secretary of the Smithsonian Institution in charge of the ational Museum, the duty devolves on me of submitting the followig report on the operations of the United States National Museum r the fiscal year ending June 30, 1918:

WAR ACTIVITIES.

During the trying conditions that have prevailed in the United tates since it entered the war, the National Museum has demonrated its value as a national asset in many ways. Members of its aff of experts, its great collections, its laboratories, and all the inormation in its possession, have been placed unreservedly at the serve of the executive departments and other Government agencies, and ave been freely used by a number of them. Some of its exhibition alls have been closed to visitors and turned into office quarters for ne of the important war bureaus of the Government. Facilities for e comfort and recreation of officers and men stationed in the vicinity nd drilling on the Mall have been provided in the buildings, and the ading rooms of the libraries have been equipped with tables and riting materials for all men in uniform.

Its department of geology has been frequently called upon to furish the Bureau of Standards, Naval Experiment Station, Departent of Agriculture, Geological Survey, the Carnegie Institution, and arious arsenals, materials for experimental work. A single call from e Bureau of Standards embraced 27 varieties of minerals, many of hich were rare. To meet all of these demands, it has been necesary to make trips into the field to secure additional supplies. At the equest of the National Research Council the head curator of this epartment has taken over the entire work of securing optical quartz r the needs of the United States and of Great Britain, involving a rge volume of correspondence and travel to different points.

The division of mineral technology has concentrated its activities r the year upon the interrelationships, and consequent interdependce, existing in the industries sustained by mineral resources. In dition to instructive exhibits, the curator and his assistants, in the lution of the problems connected with the fertilizer, sulphur, fuel, and power situations, have prepared for publication pamphlets which have been not only in great demand by publishers of technical papers, engineers, and business enterprises interested, but of particular value to the Government bureaus handling these matters. They have furnished, also, a large amount of data to the Shipping Board, the fuel and fertilizer administrations, and the War and Navy Departments, including suggestions for insuring a sustained source of oil, and for the systematic assemblage of industrial data as a basis for reconstructional work in manpower.

The division of physical anthropology has furnished a large amount of information on racial questions, particularly relating to the Balkans, to the National Research Council, and the Army and Navy Intelligence Bureaus.

In the conservation of food, the curator of the division of textiles, having charge of food and animal products, cooperated with the Food Administration in planning graphic exhibits for use throughout the country on the subject of conservation. He was also appointed exhibits director in the District of Columbia and served as chairman of the campaign committee to carry out food conservation in the District. Incidentally he has prepared and placed on exhibition an instructive exhibit of foods in the National Museum. Information was also furnished by him to the United States Shipping Board on raw commodities, and assistance in working out a system for classifying commercial data on vegetable fats and oils.

The Museum photographer has rendered valuable assistance in connection with the organization of laboratories in the War and Navy Departments, and also in confidential matters.

Other lines of work in which the Museum was active included geological and biological problems arising in gas warfare, peat investigations, questions in connection with the construction of concrete ships and other similar problems, the translating of communications, etc.

Since the war commenced 24 employees of the Museum have been granted furloughs to enter the military service of the country.

Bureau of War Risk Insurance.—In October, 1917, at the request of the President of the United States, space in the natural history building of the Museum was placed at the disposal of the newly organized Bureau of War Risk Insurance of the Treasury Department, the foyer on the ground floor and the adjoining rooms being converted into offices for the preliminary stages of the work. By rearranging some exhibition halls and by closing others, additional space was given for the purpose from time to time as the force of the bureau increased, so that at the close of the fiscal year the bureau occupied 69,286 square feet in the foyer, adjoining rooms, auditorium, and ranges on the ground floor, and in the rotunda and the exhibition halls on the first floor, extending from the center of the north hall around east through the southern section of the west hall, providing accommodations for 3,059 employees. This occupancy necessarily involved many changes and inconveniences, including the closing of the auditorium, with the cancellation of meetings and congresses. The importance of the work with which the bureau is charged—not only of providing insurance for the soldier and sailor, but of paying to their dependent families the allotments made by them and by the Government—more than justified any and all sacrifices required, and the heartiest cooperation and assistance was cheerfully rendered by the entire staff of the Museum.

On July 16, 1918, at the further request of the President, the Board of Regents closed the natural history building to the public, in order to make every foot of space in the exhibition halls available for the Bureau of War Risk Insurance.

COLLECTIONS.

The additions to the collections, received in 1,288 accessions, aggregated approximately 142,902 specimens and articles, classified by subjects as follows: Anthropology, 11,058; zoology, 61,537; botany, 38,123; geology and mineralogy, 11,370; paleontology, 17,896; textiles, woods, medicines, and other miscellaneous animal and vegetable products, 1,532; mineral technology, 308; and National Gallery of Art, 1,078. Seven hundred and eighty-one lots of material were received from various parts of the country for examination and report.

Space here permits the mention only of some of the important additions of the year.

Anthropology.—The ethnological collections were increased by some 400 specimens collected in Celebes by Mr. H. C. Raven and presented by Dr. W. L. Abbott; examples of the work of the Dyaks of Borneo, donated by Mr. Alfred M. Erskine; African, Chinese, Filipino, and Porto Rican ethnologica from Miss Josephine A. Rohrer; baskets from the Koasati Indians, a pottery-making series of the Catawba Indians, Sioux and Chippewa objects, and Voodoo drums and charms from Haiti.

Through explorations under the Smithsonian Institution came relics from ancient cliff and cavern dwellings in New Mexico collected by Dr. Walter Hough, and archeological objects from Utah gathered by Mr. Neil M. Judd. The Museum of the American Indian, Heye Foundation, sent an exchange of ancient Indian relics from the Virgin Islands, including stone implements and pottery. Stone implements were also received from Mr. J. G. Braecklein, and prehistoric implements gathered in Mexico from the Bureau of American Ethnology. Effigy earthen vessels from the Casas

Grandes, Mexico, were donated by Miss Edith Symington, and antique pottery with glaze color designs from Arizona by Mr. Victor J. Evans. The Royal Ontario Museum of Archeology, Toronto, contributed, by exchange, important Old World archeological objects, including Babylonian inscribed cuneiform tablets, stone implements from Egypt, France, and England, bronze and iron implements from Greece and Italy, besides Egyptian pottery, beads, coptic cloth, and arrowheads. A unique roasting spit found near the Colosseum, a marble head of Hercules, and some Roman coins were among the objects donated by Capt. Clarence Wiener of the British Army; of particular interest also were a bronze lamp, a rosary of Kentucky coffee beans, and a prayer book and selections from the Scriptures arranged for Jews serving in the Army and Navy of the United States.

The division of physical anthropology was enriched by Indian skulls and other bones from Alaska, Florida, Illinois, and the Navaho Reservation, a skull from the French Congo, an interesting cranium from the Malay Archipelago, a skull and part of skeleton of an Eskimo, various other skeletal specimens, and plastic restorations of certain supposedly early man.

The original full-sized Langley flying machine of 1903 and a duplicate set of cylinders for the engine were deposited in the Museum by the Institution. Begun by former Secretary S. P. Langley for the War Department in 1898, in the interest of national defense, this machine has been demonstrated to be the first aeroplane constructed capable of sustained free flight carrying a man.

To the mechanical collections were added also revolvers and swords of Santo Domingo manufacture; modern firearms of English and American make, including a British Enfield rifle, model of 1914, and an up-to-date high-power sporting rifle; three guns which belonged to the late William Cost Johnson, Member of Congress from Maryland, 1833–1843; primitive appliances used with sporting rifles from 1840 to 1870; a crude iron box with flintlock attachment designed for firing an explosive; molds for casting lead bullets; a signal pistol used by the United States Navy in 1884; and a blunderbuss said to have been used in defending mail coaches running between Baltimore and Washington in the olden time.

Mr. Hugo Worch added 26 pieces to his previous munificent donation illustrating the history and development of the pianoforte, and including dulcimers, spinets, clavichords, harpsichords, and organs, increasing the extent of this notable collection to 143 instruments.

The J. Lewis Ellis and Olive M. Ellis Memorial Collection was increased by an extensive series of articles in glass, porcelain, silver, and embroidered handkerchiefs and other textiles. Examples of Venetian glass, showing miniature portraits and landscapes by the famous glassworker, Jacopo Franchini, were received from Cavaliere Salvatore Arbib through the American consul at Venice, Mr. B. Harvey Carroll, jr. Two bronze vases presented by the Government of Japan in 1884 to Commander John B. Bernadou, United States Navy, reached the Museum through bequest of his widow. Among loans were period china and Dresden groups and Japanese and Chinese ivory carvings.

To the division of graphic arts came woodcut blocks and progressive proofs from them, the work of Gustave Baumann; specimens of intaglio color printing from Miss Gabrielle De V. Clements; illustrations of the new process "brulegravure," from the inventor, Mr. John Williams Robbins, and an akrograph portrait made by Lord Kelvin.

The historical relics included a flag flying on the Zeppelin *L-49* at the time of its capture at Bourbonne les Bains, France, October 17, 1917, by Lieut. Lefevre, of the French Army, which reached the Museum by transfer from the United States Marine Corps, through Maj. Gen. George Barnett, commandant. This was accompanied by small fragments of the gas bag and of the outer envelope of the *L-49*. Another trophy, received through President Wilson, was the American flag made at Islay House, Islay, Scotland, for use at the funerals of American soldiers lost with the transport *Tuscania*, February 5, 1918.

The original note written by Gen. U. S. Grant to Lieut. Gen. Simon B. Buckner, Confederate States Army, demanding the unconditional surrender of Fort Donelson, was contributed by Mrs. Glenn Ford McKinney, and a large collection of relics pertaining to Maj. Gen. George B. McClellan, United States Army, including a number of swords, came as a gift from his son, Hon. George B. McClellan.

Among other historical relics received were a gold watch owned by Maj. Gen. C. C. Washburn; uniform chapeaux, epaulets, military insignia, and uniform buttons worn by Col. John N. Macomb, United States Army; a uniform coat of Gen. Samuel Jones, Confederate States Army; a fragment of the Confederate military balloon made in Richmond, Va., of silk dresses; relics of the War of 1812–1815, the War with Mexico, and the Civil War, brought together by Bvt. Maj. Gen. Edward D. Townsend, United States Army; a sword carried by Col. William Dudley during the War of 1812–1815; and a snuffbox given by Rear Admiral Charles Stewart, United States Navy, to Coxswain William C. Parsons, who in turn presented it to Rear Admiral George H. Preble, United States Navy. The naval service was further represented by relics relating to Admiral David G. Farragut, from the estate of his son Loyall Farragut, augmenting the large collection received a year ago. A sword and pair of flintlock pistols owned by Brig. Gen. Daniel Roberdeau during the Revolution, and a spyglass and steel tape measure used by Lieut. Col. Isaac Roberdeau, when assisting in laying out the city of Washington, were among objects lent to the Museum, as was also a portion of the set of chinaware presented by Gen. Lafayette to Mr. and Mrs. George Graham, of Virginia.

To the historical costumes were added knee breeches and waistcoat worn during the Revolution by Col. Tench Tilghman; the official costume and sword of William L. Dayton, American minister to France in 1861–1864; the official costume and sword of William L. Dayton, jr., secretary to the American Legation in Paris during that period; and a satin dress worn by Mrs. Annette Henry Alger, wife of Russell A. Alger, Secretary of War, 1897–1899.

Particularly noteworthy is the collection of medallic Lincolniana assembled through many years by Mr. Robert Hewitt, of New York City, and presented by Mrs. Hewitt, consisting of 1,200 medallic souvenirs, including medallions, plaques, medals, coins, tokens, and badges. The Robert Hewitt collection is remarkable for the very wide range of subjects and types of numismatic material which it covers, and constitutes an epitomized medallic record of the career of President Lincoln. The United States Mint contributed a large series of bronze replicas of United States military and naval service medals, commemorative medals, and medals of award.

The philatelic material in the Museum was augmented by 3,186 specimens. Of the 2,706 transferred from the Post Office Department, 1,506 represented new issues received by the Department from the International Bureau of the Universal Postal Union.

Biology.—While the various divisions of this department report a decrease both quantitatively and qualitatively in the additions of the year, it is notable that they relate in most instances to the floras and faunas of foreign lands remote from the scene of war and war preparations.

Another trip to Haiti by the indefatigable collector and generous friend of the Museum, Dr. W. L. Abbott, resulted in important material for the Museum from that and adjoining islands, including new and rare forms of birds and reptiles. Mr. H. C. Raven, operating under the auspices of Dr. Abbott, continued collecting birds and mammals in Celebes, moving toward the middle of the island and visiting one or more of the high peaks. He obtained interesting species and genera not found at lower levels, some of the species apparently new to science and several genera new to the Museum collection. Coming from the border country between north and south Celebes, the faunas of which differ considerably, the full significance of the series can only be appreciated when the entire Celebes collection has been carefully studied.

The Bureau of Science at Manila contributed a large lot of plants from Amboina, Borneo, and the Philippines. From the Philippines came also an important collection of named chaetognaths transferred by the Bureau of Fisheries, and land shells donated by Mr. Walter F. Webb; and butterflies from the Philippines and Yucatan were contributed by Mr. B. Preston Clark. Hawaii sent a large lot of plants collected by Mr. A. S. Hitchcock, besides algae and mollusks.

South America was represented by the important collections of mammals, amphibians, and reptiles collected by the Peruvian expedition of 1914–15, under the auspices of Yale University and the National Geographic Society, adding the first fully representative series in these groups received by the Museum from any large area of South America. The Museum has been and is even now extremely deficient in material from that continent, and the collections presented by the authorities responsible for this expedition are therefore of the utmost value as forming the basis of future work by American zoologists in that long-neglected field. A collection of fishes from western Colombia, received by exchange from the Carnegie Museum, Pittsburgh, supplements material obtained a few years ago in connection with the Smithsonian biological survey of the Isthmus of Panama, as did also a series of plants from Panama contributed by Mr. Ellsworth P. Killip. From Argentina, Venezuela, Curaçao, and the Galapagos Islands came large lots of plants.

South and Central America, as well as western United States, were represented in the donation by Dr. Harrison G. Dyar, custodian of Lepidoptera, of personal collections aggregating some 35,000 insects and including some 15,000 named Lepidoptera, 1,000 named sawflies, and large series of mosquitoes and miscellaneous Diptera.

A new genus and species of river dolphin from Tung Ting Lake, China, afforded a remarkable novelty in the increment to the mammal collection, belonging to a group of porpoises which includes numerous extinct forms found fossil in Europe and the eastern United States, its only known living relative occurring in the large rivers of South America.

In northern China interesting series of birds, mammals, fishes, reptiles, and insects were collected for the Museum by Mr. Arthur de C. Sowerby, who has lately returned to England for war duty. These supplement collections made by him in that country for the Museum during the past 10 years. From China came also some 1,200 plants from the Canton Christian College, and Chinese and Japanese plants were obtained from the Arnold Arboretum of Harvard University.

The Collins-Garner Congo expedition, on which the Museum is represented by Mr. C. R. W. Aschemeier, sent large lots of well-prepared mammals and birds and smaller numbers of insects, plants, and shells from the French Congo, greatly needed for comparison with the remarkable East African series in the Museum. Of birds alone this contains 10 or more species hitherto not possessed by the Museum and at least 1 genus.

The Public Library Museum and Art Gallery of Western Australia, at Perth, supplied in exchange a number of particularly desirable mammals, birds, reptiles, and batrachians from Australia.

Even the Arctic contributed to the additions of the year. Nearly 700 crustaceans and mollusks collected by the Canadian Stefansson Expedition to the Arctic, 1913–1916, were presented by the Dominion Commission of Fisheries, Department of Naval Service, Ottawa, in recognition of services rendered by members of the Museum staff in identifying material.

During his explorations in British Columbia, Secretary Walcott collected for the Museum a number of large mammals, including a family of moose, which form a valuable addition to the North American series of mammals. The activities of various Government agencies, mainly the Bureau of Fisheries and the several bureaus of the Department of Agriculture, resulted in much material for the Museum from the United States, representing practically every branch of biology and including particularly large series of grasses and insects. Of North American material mention should also be made of especially well prepared bird skins and skeletons from southern California presented by Mr. Edward J. Brown; marine invertebrates collected in Magdalena Bay by the donor, Mr. C. R. Orcutt; a killer whale from Florida representing a genus new to the coasts of the United States contributed by Mr. Lawrence S. Chubb, and plants from Alaska and California from Prof. W. L. Jepson.

Various localities, both domestic and foreign, were represented in an exchange from the Boston Society of Natural History of over 2,300 crustaceans and mollusks, and some 12,000 specimens of American and foreign bird eggs were lent to the Museum by Dr. T. W. Richards, U. S. Navy.

Geology.—Special attention was paid to building up the collection of minerals heretofore classed as rare earths and rare metals, which have become of importance through the outbreak of the war. A group of exhibition specimens secured mainly through the efforts of Mr. F. L. Hess consists of a large mass of scheelite ore weighing 2,614 pounds, showing the full width of the vein and said to be the largest mass of tungsten ore yet mined; about 100 pounds of molybdenum-copper ore showing the interesting geological associations of molybdenite; partly oxidized tungsten showing the atmospheric alteration of the common tungsten ore mineral wolframite; scheelite ore replacing limestone and showing unusually large cleavage surfaces of the ore mineral; a sawn mass of brecciated ferberite ore—the so-called "peanut ore;" a specimen of molybdenite; molybdenite and molybdite in altered rhyolite; a mass of the newly discovered sulphide tungstenite; crystallized ferberite; and a collection of 15 ores and minerals, including molybdenite from Canada, carnotite replacing wood, ferberite in the form of iridescent crystals, and a specimen of the rare uranium-vanadium mineral uranite impregnating friable sandstone.

The exhibit of steel-hardening metals was further augmented by specimens of vanadium ores with incrustations of crystals of the ore minerals vanadinite and descloizite. Other gifts of interest include a series of specimens from the famous nitrate deposits of Chile showing the caliche and its natural associations, a cross-fiber vein of asbestos showing unusually long pure fibers, and sandstone impregnated with the blue molybdenum sulphate, ilsemannite.

Collections made for the division by members of the staff included large exhibition specimens illustrating unconformities, conglomerates, rock phosphate, and phosphatic limestone secured by Dr. R. S. Bassler; albite crystals of unusual type, columbite, black mica, staurolite, bauxite, and quartz, the last named mainly for use by the Signal Corps of the Army, collected by Dr. George P. Merrill; rocks to illustrate weathering, obtained by Dr. J. C. Martin; sphalerite with associated minerals and brecciated chert, and apatite and hematite, collected by Dr. Edgar T. Wherry.

A mass of graphite, showing an unusual columnar structure, was transferred from the United States Geological Survey, as were also blocks, fragments, and pebbles from an Alaskan glacial ground moraine of Silurian age, and a choice figured specimen of arborescent calcareous sinter from the Mammoth Hot Springs, Yellowstone National Park.

Of meteorites there were added a newly found stone from Eustis, Fla.; a slice of the Carleton siderite; 280 grams of an undescribed stone from Kansas City, Mo.; and an 826-gram specimen of the Burkett (Tex.) meteoric iron.

In the division of mineralogy and petrology gifts of exceptional value from Mr. C. S. Bement included particularly fine exhibition specimens of hetaerolite, crystals of rhodonite, zincite, leucophoenicite, manganosite crystals, a cut gem, a free crystal and an embedded crystal of willemite, and willemite with friedelite and white zeolite, all from Franklin, N. J.; calamine, pyrite, and milky quartz, from Colorado; free crystals of scheelite and scheelite crystals attached to chalcopyrite, from Mexico; an exceptionally fine, large twinned crystal of quartz and an unusual crystal of danburite, from Japan; the rare mineral achtaragdite and a variety of vesuvianite—wiluite—from Siberia.

The American consul at Changsha, China, Mr. Nelson T. Johnson, donated a specimen of twinned cinnabar crystals from China, showing seven groups of crystals more than half an inch in diameter, and as far as known the finest of its kind in the United States.

Other additions included crystals of tetrahedrite embedded in quartz, galena with crystals of anglesite, gem stones of variscite, opalized shells from the Cretaceous of South Australia, beryl, milky quartz crystals, crystals of selenite, large pyrites, aragonite crystals, besides type specimens presented by Dr. Henry S. Washington, of the Geophysical Laboratory, and minerals described by Prof. A. S. Eakle, of the University of California, and by Dr. W. F. Hillebrand, of the Bureau of Standards.

Specimens illustrating the geology and ore deposits of the Tintic district, Utah, the basis of Professional Paper 107, of the Geological Survey, by Prof. Waldemar Lindgren and Dr. G. F. Loughlin, were received as a transfer from the Survey, and an interesting series of rocks collected in the Orient by Dr. J. P. Iddings, in 1910, was formally turned over to the Museum.

Of the increment to the collections of invertebrate paleontology mention should first be made of about 10,000 specimens of Middle Cambrian fossils obtained by Secretary Walcott from the celebrated locality at Burgess Pass, British Columbia, comprising the study and reserve material of this wonderful fauna, the types of which were previously received as were these, by deposit from the Smithsonian Institution.

A number of large fossils, mainly corals, and fossiliferous limestone slabs were collected by Dr. Bassler for enlarging the coral reef installed in the exhibition series last year.

Well preserved invertebrate fossils from the Cretaceous formation of Tennessee constituted the most important addition to the Mesozoic collections. Of interest both for exhibition and study were fossil insects preserved in copal resin, collected by Prof. D. S. Martin by searching the gum copal from the Pleistocene deposits of East Africa shipped in large quantities to the varnish factories in the vicinity of Brooklyn.

Paleozoic and Mesozoic fossils especially selected to round out the study series of European forms, and ammonities from the Jurassic rocks of France needed in the revision of the exhibit of these forms, were secured by exchange. To the study series were added Tertiary fossils from the Pacific coast, and the Devonian stratigraphic series was increased by a rather complete representation of fossils from the Hackberry and Hamilton groups of Iowa. Small lots of well-preserved Eocene insects and a fossil fish collected in Colorado were of interest because of their rarity.

The section of vertebrate paleontology secured from the United States Geological Survey, the most important collection of fossil turtle remains ever brought together from the southwestern part of he United States, many specimens being suitable for exhibition and no less than 49 are sufficiently well preserved to be identified specifially. Other well-preserved turtles acquired included the type of a box turtle described by Dr. O. P. Hay, and an example from the Cretaceous of Georgia, valuable chiefly on account of its locality.

Fossil bones of the mammoth, rhinoceros, and horse collected for he Museum in Siberia by Mr. John Koren to supplement the maerial obtained by the Koren expedition in 1914–15, included a beauifully perfect mammoth humerus over 3 feet in length, indicating an animal of magnificent proportions.

Type material comprised the important additions in paleobotany. Fossil plants from Wyoming, the basis of a paper by Dr. F. H. Knowlton, were transferred from the survey; two lots from South America were contributed by Prof. E. W. Berry, the first from the Tertiary rocks of Bolivia, valuable not only as type specimens, but in furnishing data for additions to the geologic history of that country, the second from the Miocene of Peru; and specimens from Beaver County, Okla., described by Prof. Berry, were donated at his request by Prof. E. C. Case.

Textiles.—The efforts of domestic manufacturers to take advantage of the opportunity afforded by the war is shown by upholstery velvets and velours manufactured in this country from mercerized cotton, mohair, or silk, or combinations of these, including antique venetians made of mercerized cotton in imitation of old French and Italian fabrics and intended to take their place at a reasonable price.

The silk goods series was augmented by new figured novelty silk representing beautiful effects in the cross-dyeing of combinations of cotton, wool, artificial silk and spun silk, brocaded piece-dyed satins, figured cross-dyed crêpe georgette, crêpe meteore, and fabrics printed in designs suggesting water movements, silk poplins, georgette crêpe printed in spiderweb-like design called "camouflage," and suggesting Japanese batik work, "Moon-Glo" crêpe, a novelty crêpe weave fabric with metalliclike surface, and a rough surface fabric printed with an all-over oriental design.

Fine silk fabrics ornamented with attractive designs by means of discharge printing are believed to be among the best examples of this method of printing fabrics that have been produced in the United States. These included Luxor taffeta, in Persian, Saracenic, and Italian designs of the eighth, thirteenth, and fourteenth centuries, copies from ancient Peruvian fabrics, and Wedgwood prints which carry out remarkably the relief effect copied from Wedgwood pottery.

Woolen fabrics of the worsted type, woven from combed wools, are well represented in the Museum collections, but the carded woolen industry has not been adequately covered heretofore. Particularly welcome therefore were some excellent examples of this type of fabric, comprising broadcloth, beaver, zibeline, chinchilla, flannels, overcoatings, and a strong corkscrew-weave fabric used for shoe tops. Owing to the need of conserving wool for use in the manufacture of military clothing, new types of fabrics for civilian use have been put on the market by manufacturers. One of these reaching the museum, "Honey cloth," is a cotton warp worsted having the weft threads composed of one-fourth mohair and three-fourths wool.

To the series of implements used in preparing and weaving textile fibers were added an old flax breaker and two small looms of the types employed in producing Gobelin and Beauvais tapestries, together with a repairing board used in mending such fabrics. Some of the first embroidery machines brought to the United States from Europe are doing war work by embroidering service insignia for the Government. A contribution of 107 specimens of such official emblems of the United States Army, the United States Navy, the Food Administration, and the Boy Scouts of America, on standard uniform fabrics, makes a popular exhibit.

In emphasizing the importance of food conservation a large series of foodstuffs received as gifts from manufacturers or as transfers or loans of Government property enlarged the old section of foods and permitted an exhibit along the line of the Food Administration. Besides series of wheat substitutes, examples of the conservation of surplus fruits and vegetables by dehydrating and by canning were secured, and material to show the high food value of soy beans and peanuts. An exhibit of 74 models of ordinary articles of diet, each one representing a quantity of food sufficient to produce a heat value of 100 calories, shows graphically the relative heat value of the various articles in a manner easily comprehended by everyone.

Hand samples of woods produced by 344 trees indigenous to North America, carefully determined in the preparation of the Tenth Census Report as to value as fuel and for construction, reached the Museum from the United States Naval Academy at Annapolis, and the New York State College of Forestry contributed a collection of wood specimens representing the more important species in use in the industries of New York State. Other additions to the section of wood technology included log sections cut from trees felled in Smithsonian and Seaton Parks in recently clearing the ground for the erection of temporary buildings for the War Department; an elaborate display of "Korelock" doors; a standard aeroplane propeller and an impeller also of laminated wood construction; specimens showing steps in the manufacture of a baseball bat, of a wagon wheel, of an automobile wheel, of a saw handle, of a billiard cue; and various specimens of California redwood.

In the division of medicine efforts were concentrated on obtaining hibition material of educational rather than scientific value. Illus- ating organotherapy was a series of fresh specimens of glands and andular tissues together with finished products of the different rms in which they are administered. Specimens illustrating the anufacture of pepsin and the finished product in various forms in- uded a sample of pure pepsin with a standardized strength of 20,000, that is, it has the power to dissolve 20,000 times its own eight of freshly coagulated and disintegrated egg albumen. Other hibits of crude vegetable drugs, synthetic medicinal chemicals, in- ganic chemicals, plant constituents, opium and its products, cin- ona bark, aloes, and cascara sagrada were secured.

Mineral technology.—In assembling collections representative of ineral technology, comprehensive popular exhibits had been ar- nged at the beginning of the year, comprising abrasives, asbestos, sphalt, cements, coal, copper, glass, gold, graphite, iron, lead, lime, ica, petroleum, plaster, salt, sulphur, and tin. Under existing con- itions it was decided to confine activity to enhancement of what as already established, deferring for the time being the various rojects for numerical expansion. Accordingly an exhibit was added the coal series showing the scope of recent American enterprise the direction of coal product manufacture. It consists of a 200- ound lump of bituminous coal with derivatives in the form of dye- tuffs and other chemicals to the number of 233. The series treating f gold was enriched by a large panoramic model showing the occur- ence and the various methods employed in winning the metal. The agnificent panoramic model of the Bingham Canyon Copper Min- g operations was completed, as was also the model, in part placed n display a year ago, showing the operations of lead manufacture.

In an effort to be of service in the present emergency of war five nes of investigation, which have been under consideration for sev- ral years in assembling exhibits, have been developed in the course f the year. These comprised fertilizer materials, sulphur, coal roducts, power, and petroleum. To mobilize the economic forces f production and to fill in their gaps is as necessary as that of ffecting the requisite military organization, and far more intricate. he difficulty in building up deficiencies as they become apparent es in the complexity of interrelationship. Especially is this true mong the chemically conducted industries. First, there is the group lationship of progressive segregation, notably instanced in the al-product series, wherein the isolation of any one product entails e work leading to the isolation of many others. Then comes the roup relationship of recombination into usable form, as in the case f fertilizer manufacture, where an entirely different basis of interdependence is established drawing variously upon the other groups and linking them together. Thus to build up a deficiency in any one specific direction it often becomes necessary to carry the work of reconstruction far afield.

As applied to mineral derivatives, the question of interrelationship has been a subject of special study in the division of mineral technology from the time of its establishment, and it was felt from the outset that here lay the chief opportunity to render service. When the country's deficiency in fixed nitrogen came up for consideration some two years ago occasion was taken to point out[1] that a nitrogen situation as a thing apart and to itself did not and could not exist—that it was inextricably involved with the coal-product situation and fertilizer situated, and that the only remedy lay in giving heed to this interrelationship. So it is with the work of mobilizing the various other chemically conducted industries on a war-time basis. The need of giving advance heed to this question was appreciated by our enemies—Germany entered the war as fully prepared in this field as in the military branches. It was inadequately appreciated by those who eventually came to be our allies, however; while in the United States, up to the actual outbreak of hostilities, it was entirely disregarded as a national issue. Paramount among the problems thus entailed are those presented by the industrial groups having to do with the fertilizer materials necessary to an adequacy of foodstuffs, and with the energy resources requisite to the work of manufacture. In contributing to the solution of these two basic problems investigations projected by Mr. Chester G. Gilbert, comprising fertilizer materials, sulphur, coal products, power, and petroleum, have resulted in the publication of pamphlets on the interpretation of the fertilizer situation, industrial independence in sulphur, an object lesson in the resource administration in coal products, and the coal resource and its full utilization. Papers on power and petroleum were completed but not published at the end of the year. In view of the tendency toward duplication in the scientific work in Government departments, it is of special note that it is not purposed to initiate any new scientific or technical lines of work, but merely to interpret technical facts in popular form. This is not only of vital importance but it is peculiarly the function of the National Museum.

NATIONAL GALLERY OF ART.

In the last report it was stated that foundations had been laid for a granite structure on the Smithsonian Reservation to house the Charles L. Freer Collection. Though some delays were encountered n procuring materials and labor, the construction of this building as progressed during the year as rapidly as could be expected, condering the vast undertakings of the Government in constructional nterprises in Washington due to the war. By June 30, 1918, all of ıe exterior walls were erected to entablature height and about half f the architrave and frieze courses of the entablature were set. our-fifths of the interior walls had risen to gallery ceiling height nd all others were well advanced. The marble walls of the court ere completed to about two-thirds of their ultimate height. The asement and first floor construction were completed, the drainage ystem below the subbasement floor finished, and 10 per cent of the eating and ventilating duct work in the subbasement installed.

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[1] Sources of nitrogen compounds in the United States, by Chester G. Gilbert, Smithsonian Institution Special Publication No. 2421, June, 1916.

During the year Mr. Freer increased the extent of his collection to ver 6,200 items by 928 additions, of which 20 are paintings by the merican artists Whistler, Tryon, Dewing, Melchers, Metcalf, Sargent, and Brush; while the oriental objects, numbering 908, consist f paintings, pottery, fabrics, jewelry, and objects of jade, bronze, vood, stone, glass, and lacquer.

By bequest of Mrs. Mary Houston Eddy, of Washington, the gallery received a collection of 12 paintings, 12 miniatures, 9 ivory arvings, a Limoges enamel, a marble bust, a bronze statue, and misellaneous art objects, 140 items in all, to be known as the "A. R. and M. H. Eddy Donation." Other permanent acquisitions were portraits by Ossip Perelma of M. Boris Bakhmeteff, first ambassador to the United States from the Russian Republic, and of Mr. Frank B. Noyes, president of the Associated Press and editor of the Washington Star; a portrait of Vinnie Ream (Hoxie), by G. P. A. Healy; a marble statue of Puck, by Harriet Hosmer; two miniatures by Isabey, one of Napoleon I, the other of Marie Louise; two old English silver snuff boxes and two large plaster landscape models made in 1902 of the park system proposed for the city of Washington by the commission appointed by the Senate Committee on the District of Columbia.

The special loan exhibitions consisted of a collection of Joseph Pennell's lithographs of war work in Great Britain and the United States, displayed from November 1 to 24, 1917, with a special view n the evening of the 1st; and a series of architectural drawings by harles Mason Remey, being preliminary designs showing varying reatments in different styles of architecture of the proposed Bahai emple for Chicago, exhibited during March, 1918.

As elsewhere stated, the natural history building is, under normal onditions, greatly overcrowded with the collections of its departnents of biology, geology, and anthropology and of the art gallery, early one-fourth of its space being given over to art in its various forms. The need of considering the erection of a building exclusively for the National Gallery of Art is pressing and should early receive attention. The gallery has already failed to acquire many rich gifts of art works because of the impossibility of caring for them in the present buildings, and other cities are being enriched at its expense. Because of this unpreparedness, treasures of art of great worth well within its reach have gone elsewhere. Art works more than any other national possession typify advanced civilization, and the public demands means of acquiring and keeping and facilities for utilizing such. Most modern nations have made their capital cities principal centers of art development and art accumulation, and progress in this respect may well be regarded as an index of the degree of advancement of the people.

MEETINGS AND CONGRESSES.

The facilities afforded by the Museum for meetings were in greater demand than usual for governmental and scientific gatherings and were fully utilized until the latter part of October, when the committee rooms were temporarily given over to the Bureau of War Risk Insurance. Meetings continued to some extent to be held in the auditorium until the last of December, when all engagements of accomodations were canceled, and the auditorium was also placed at the disposal of that bureau.

The Washington Society of the Fine Arts, as customary, was granted the auditorium for its lecture courses for the season, but held only five at the Museum. One of the committee rooms was assigned to the Anthropological Society of Washington and to the Federal Photographic Society for their regular meetings for the winter. The former used it but once, holding four other assemblies in the auditorium, and the Photographic Society went elsewhere, though it used the auditorium twice in July for exhibitions of motion pictures.

The American Public Health Association held a three-day session in the auditorium, on health problems and opportunities of the war, with a reception on the opening night, and the Medical Society of the District of Columbia celebrated its centennial anniversary by an afternoon meeting there.

The facilities of the Museum were used by various Government departments for conferences (1) to formulate plans for the production and conservation of the live-stock industry of the United States, (2) in the interest of fall wheat and rye planting, (3) of State agents on home demonstration work in the South, and (4) on home economics; for the pathological seminar of the Bureau of Plant Industry; for a lecture on horticultural work in China; for a meeting of the women employees of the Department of Agriculture to discuss rticipation in war activities; for a second liberty loan meeting Post Office Department employees; for two exhibitions of motion ctures relating to Army aeronautics for the Signal Corps of the nited States Army; for a three-day school of instruction in the rtherance of the work of the United States Food Administration; ıd for lectures, on two occasions under the auspices of the National ouncil of Women, on one under the District of Columbia Chapter the American Red Cross, and another under the Women's Liberty oan Committee.

Before the auditorium was turned over to the Bureau of War Risk ısurance, that bureau frequently made use of it for instructing and ganizing the field parties of officers and enlisted men who were to sent to the various camps to attend to the details relating to the suance of life insurance.

For two days the auditorium was given over to the annual meeting the Potato Association of America, and the Bureau of Commercial conomics made use of it three times showing motion pictures of the ar, to Army officers, on the first two occasions, and to members of ıe National Council of Defense on the last.

Besides the reception to the American Public Health Association ı the evening of October 18, there was a reception in the National allery of Art on the occasion of the opening of the exhibition of thographs of war work by Joseph Pennell on the evening of No- ember 1.

MISCELLANEOUS.

Over 8,000 duplicate specimens, included in 8 regular sets of mol- ısks, 5 regular sets of fossil invertebrates, and a number of special ts, were distributed to schools and colleges. Exchanges for secur- ıg additions to the collections involved the use of about 23,227 dupli- ıtes, while more than 11,000 specimens, chiefly botanical and zoologi- ıl, were lent to specialists for study.

The attendance of visitors at the natural history building aggre- ated 306,003 persons for week days and 95,097 for Sundays, being a aily average of 977 for the former and 1,828 for the latter. At the rts and industries building and the Smithsonian building, which are pen only on week days, the totals were, respectively, 161,298 and 7,224, and the daily averages 515 and 214.

The publications of the year consisted of the annual report, one olume of proceedings, one volume of the contributions from the ational Herbarium, and three bulletins, besides 40 separate papers. he latter comprised 28 from the proceedings, 4 from the contribu- ons, 7 parts of bulletins, and a catalogue of a special loan collection the National Gallery of Art.

The library obtained, by purchase, gift, and exchange, 6,162 volumes, 42 parts of volumes, and 1,541 pamphlets. The more important donations were the library of Biltmore Herbarium, and a large series of pharmaceutical works transferred from the Hygienic Laboratory.

Respectfully submitted.

W. DE C. RAVENEL,
Administrative Assistant.

Dr. CHARLES D. WALCOTT,
Secretary of the Smithsonian Institution.

OCTOBER 31, 1918.

APPENDIX 2.

REPORT ON THE BUREAU OF AMERICAN ETHNOLOGY.

SIR: Pursuant to your request of July 3, I have the honor to submit the following report on the operations of the Bureau of American Ethnology during the fiscal year ended June 30, 1918, conducted in accordance with the act of Congress approved June 12, 1917, making provisions for the sundry civil expenses of the Government, and in accordance with a plan of operations submitted by the ethnologist-in-charge and approved by the Secretary of the Smithsonian Institution. The act referred to contains the following item:

> American ethnology: For continuing ethnological researches among the American Indians and the natives of Hawaii, including the excavation and preservation of archæologic remains, under the direction of the Smithsonian Institution, including necessary employees and the purchase of necessary books and periodicals, $42,000.

The administrative affairs of the bureau prior to March 1, 1918, were conducted by Mr. F. W. Hodge, ethnologist in charge, when he resigned to accept a position in the Museum of the American Indian (Heye Foundation). On that date Dr. J. Walter Fewkes was appointed chief, and continued the administrative duties of the office to the close of the year.

As the American Indian is rapidly losing many of his instructive characteristics in his amalgamation into American citizenship, new features of the future work of the bureau stand out prominently pleading for investigation. Among these is the urgent necessity to rescue linguistic, sociological, and mythological data of aboriginal Indian life before its final extinction. When data now available disappear, unless recorded, they are lost forever.

The excavation and repair for preservation of archeologic remains, by no means a new activity of bureau work, is in the same condition. Both anthropology and popular approval call for the advancement and diffusion of knowledge by the bureau along this line.

In addition to their duties in "continuing ethnological researches" among the American Indians the members of the staff have devoted much time to matters germane to their work. Answers to many letters received by the bureau can not be written offhand, but demand investigation and often considerable consultation of authorities in the library. Their requests are not confined to Indian ethnology, but include a wide variety of questions on race mixture in the United States, Old World anthropology, and the like. Although the staff is made up of experts in the study of the American Indians and the appropriation is limited to the study of our aborigines, the chief has not shrunk from the necessity of contributing what information he could on these related subjects, recognizing the need in the near future of a Bureau of Ethnology.

The "ethnological researches" of individual members of the staff the past year are outlined in the following pages.

At the close of the last fiscal year Mr. F. W. Hodge had begun excavations at Hawikuh, one of the "Seven Cities of Cibola," situated near the present pueblo of Zuñi, N. Mex. This work was continued in the summer months and yielded a large and varied collection of artifacts, which are now in the Museum of the American Indian (Heye Foundation).

The excavations were confined to the great refuse heaps that cover the western side of the elevation on which the ruins are situated, the maximum height of the hillock being 60 feet above the eastern valley. It was believed that this refuse would be found to follow the configuration of a gradual slope, but this proved not to be the case, for the farther the excavation was carried toward the ruined walls on the summit the deeper the refuse was found to be, and continuous work for nearly three months in this direction failed to reach a natural slope or escarpment.

The removal of the refuse, which had reached a depth of 15 feet when the work was suspended for the season, brought to light many features of interest, for, as was expected from the character of the surface soil, this great deposit of débris, consisting largely of ash and other refuse from the dwellings, interspersed with quantities of broken pottery and other artifacts, strata of drift sand, building refuse, etc., formed one of the cemeteries of the pueblo, or, one might say, the western area of a single great cemetery that surrounded the pueblo which, with its appurtenances, covers an area of approximately 756 by 850 feet, or nearly 15 acres. Excavation of perhaps a fifth of the cemetery area resulted in uncovering 237 graves.

Excavation had not proceeded very far before remains of walls of dwellings much older than those of historic Hawikuh were encountered on the floor of the original surface, 15 feet below the maximum deposit of refuse; yet, as the work progressed, it was found that these walls had been built over and across the walls of other and more ancient houses that had been erected, occupied, abandoned, and filled in to afford space for the construction of the dwellings which in turn preceded Hawikuh probably by many generations. The masonry of these earlier structures, on the whole, was much cruder than that of Hawikuh proper; but if allowance be made for disturbance aused by the burial of the dead through several generations, which ncluded more or less comparatively recent pottery in the lower evels, the earthenware of the earliest inhabitants of the site is of iner quality and of finer decoration than that manufactured by the istoric Hawikuh people not long before the abandonment of their ettlement.

Although the study of the archeology of Hawikuh has been barely ommenced, the results of last season's work give promise of a naterial addition to our knowledge of an important phase of Pueblo ulture, and it is hoped will ultimately open the way to the solution f related problems in southwestern archeology.

Besides the routine work of his desk Mr. Hodge gave what spare time he could while in Washington to continuing his work on the bibliography of the Pueblo Indians.

During July and August Dr. J. Walter Fewkes, ethnologist, completed his report on the Heye collection of West Indian antiquities and in the autumn made a brief archeological reconnoissance in southwestern Colorado, returning to Washington the middle of November. His plan of operations was to visit the ruins in the McElmo district and determine their architectural features in order to define with greater exactness the characteristics they share with the cliff dwellings and pueblos of the Mesa Verde National Park. The object was to gather material that would enable him to construct a classification of the prehistoric buildings of the Southwest from structural data. The Mesa Verde cliff dwellings and pueblos belong to a type or group of ruins distinguished by the structure of the roof and other features of the ceremonial room or kiva. The aim of the field work in 1917 was to investigate the distribution of this form of kiva and to discover other peculiarities of the Mesa Verde type or group at points remote from the plateau and thus enlarge our knowledge of the geographical distribution of the types.

It was found that the ruins in Montezuma Valley and the McElmo and its tributaries show extensions westward of the Mesa Verde type, and as the field work progressed much was added to our knowledge of the characteristics of great houses and towers, the examples of which on the Mesa Verde have been little investigated.

The most noteworthy group of the ancient ruins visited in the course of his field work were three clusters of great houses, castles, and towers situated a short distance over the State line on the northern tributaries of the canyons of the McElmo.

The most important result of the field work in 1917 is the conclusion that the ruins of the McElmo region indicate a people allied to those of Mesa Verde, who reached a high degree of architectural technique, surpassing any in America north of Mexico. Evidence was gathered that it was preceded by a stage indicated by one-house construction, and the suggestion is made that it antedated pueblos, on which account it has been designated a middle phase in the Southwest. A considerable number of small ruins of the same structural type but with only one room were discovered in the tributaries of the McElmo and Dolores Rivers.

As a sequel to the exploration of the great houses, towers, and pueblos of Square Tower, Holly, and Hackberry Canyons, at the suggestion of Dr. Fewkes, the Director of the Public Park Service, Department of the Interior, has taken steps to have the ruins on these and adjacent canyons set aside from the public domain as a reserve, to be called the Hovenweep National Monument.

During the year Mr. James Mooney, ethnologist, remained in the office, engaged, as impaired health permitted, in the elaboration of his Cherokee sacred formulas. Throughout the winter and spring months much of his time was given to assisting the various delegations from the tribes of his working acquaintance, in the West, in their efforts before Congress, particularly in regard to their native Peyote religion, of which he has made a special study. The proof of friendship in the assistance thus given has completely won the hearts of the tribes concerned, and has opened the door to successful investigation along every line of inquiry.

On June 28 he left Washington for an extended stay with the Kiowa and associated tribes, among whom he is now at work.

During the past year, Dr. John R. Swanton, ethnologist, has devoted the greater part of his time to a study of three languages formerly spoken on and near the lower course of the Mississippi River—the Tunica, Chitimacha, and Atakapa (or Attacapa). The results of this study have been embodied in four papers—sketches of the grammars of the three languages in question, and a comparative study. A sketch of the Tunica language, covering about 70 typewritten pages, has been accepted for publication in the International Journal of American Linguistics. The sketch of Atakapa, of 40 or 50 pages, is practically complete and is designed for publication in the same journal; that of Chitimacha covers about 100 pages. The latter is withheld from publication for the present so that more material may be added. Finally, the paper in which the three languages are compared and the conclusion drawn that they belong in reality to but one linguistic stock, is to be published as a bulletin by this bureau. This covers about 70 typewritten pages.

During the latter half of April and all of May Dr. Swanton was engaged in field work in Louisiana, Mississippi, and South Carolina. In the first-mentioned State he continued his investigation of the Chitimacha language. His visit to Mississippi was principally for the purpose of inquiring into the social organization of the Choctaw till living there. In South Carolina he began a study of the Catawba inguage, with the help of manuscript material left by Dr. Gatschet, nd he plans to continue this study during the coming year. It is nportant as the only well-preserved dialect of any of the eastern iouan peoples and that upon which must be based most of the relaonship of the eastern Siouans to the other divisions of the stock. small amount of ethnological material along other lines was also ollected from the Chitimacha and the Catawba.

Dr. Swanton has also added some material to his history of the reek Indians.

In July, 1917, Mr. J. N. B. Hewitt, ethnologist, began a critical and omparative study of the Cayuga texts relating to the Iroquois Fedration, which he had recorded during the two previous field trips. his manuscript matter aggregates more than 500 pages and treats f more than 40 topics or features of the Federation of the Iroquois, ealing with the principles and structure of this institution of the ive "Nations" or tribes.

This comparative study was carried to tentative completion and nvolved not only the critical reading of the 500 pages of Cayuga text, ut also an equal number of pages of Mohawk and Onondaga texts.

Mr. Hewitt also read 200 galleys of proofs of the Seneca myths nd tales of the Thirty-second Annual Report of the Bureau of Amerian Ethnology, of which 20 were of native texts with interlinear ranslations; he added to them nearly 200 numbered explanatory otes and read also 632 pages of the first and second revises for this ame report, of which 100 pages are in native text with interlinear ranslations.

During May and June, 1918, Mr. Hewitt was engaged in field ork in Ontario, Canada, among the Indians of the Six Nations of roquois. He took up the work in textual and literary criticism of he many texts he has recorded relating directly to the institution of he Federation or League of the Five Tribes or Nations in earlier eld operations.

By far the largest, and also the most trustworthy, part of these xts was recorded from the dictation of one of the best-informed itualists and expounders of the league, but much additional and suplementary matter in the form of texts was recorded from the dicition of other informants who had the reputation in the community f being authorities in regard to the motives and plans of the foundrs of the federation or league and the decrees and ordinances proiulgated by them; but as these texts were given from memory it as inevitable that some of the most important details of the strucire and working apparatus of the league have not been remembered ith the same fidelity by different persons, and so various views and atements concerning the same subject matter are found. The problem for the student, then, is to ascertain by an adequate investigation upon what facts these conflicting views and statements were originally based. The vocabulary of the national terms employed is that of statecraft and ritualism—the utterances of the statesmen and stateswomen of that earlier time, who had clear visions of institutions which are to-day being formulated and written into the statutes of our great republic. Among these may be mentioned the recall, the initiative, the referendum, a full-fledged colonial policy, and woman suffrage (limited to mothers), men having no voice in the body which nominates their chiefs.

It is well-nigh impossible to find an interpreter among the Iroquois who is such a master of both the English and the native Iroquoian languages as to be able to translate correctly a large number of the most important native terms into the English tongue. The following may be taken as a typical example. Dekanawida, in detailing the work of the founders in his "farewell address," used the following term frequently, and it also occurs elsewhere. This word is "We’dwĕñnă’keră‘dă′nyoñ’." The literal meaning is "We have made types or symbols of things." This is the only rendering known to most native interpreters. But its technical signification is "We have made ordinances, or laws, or regulations."

Another form of criticism is the discovery of the reasons which led to the variation of the ritual as used by the father and mother sides of the league. As an example the following may be cited. One or the other of these sides is the mourning side in the council of condolence and installation. The side which is not the mourning side employs all fourteen of the sections of the "Requickening address." But it is customary for the mourning side, in replying, to employ only thirteen, omitting the ninth, which refers to the caring for the grave of the dead chieftain. This omission may seem to be a small matter to solve, but it is one which brings out the intense esoterism and metaphoric use of terms that characterize terminology of the institutions of the federation or league of the five nations or tribes of the Iroquois.

This definition or meaning shows that the rules of procedure among the Iroquois Five Tribes were not the commands of an autocrat or tyrant, but rather the formulated wisdom of a body of peers who owed their position to the suffrages of those who owned the titles to them, and that the form of government was a limited democracy, or, strictly speaking, a limited gynecocracy.

At the beginning of the year Mr. Francis La Flesche, ethnologist, took up the task of putting together his notes on the "Wa-shá-be A-thi^{n}," a composite and intricate war ceremony of the Osage tribe. The name signifies the determination of the warrior who becomes a member of the ceremonially organized war party to show no mercy o the enemy and that he shall be even as the fire—a power that conumes all things that happen to be in its destructive course.

The literal translation of the name, Wa-shá-be Athi^{n}, is Wa-shá-be, a dark object; A-thi^{n}, to have in one's possession to carry. The word "Wa-shá-be" is here used as a trope for the charcoal that symbolizes he merciless fire. The making of the symbolic charcoal forms an mportant part of the great ceremony and each warrior is required to carry with him a piece of this charcoal tied up in a little buckskin pouch. When he is about to attack the enemy he must blacken his face with this charcoal. If he happens to neglect this he will not be permitted to recount the strokes he may deliver the enemy in the attack and to count his war honors.

Originally there was only one "Wa-shá-be A-thi^{n}" ceremony and his ceremony pertained strictly to defensive and aggressive warfare. Later this ceremony was employed for organizing a war party o be sent out to slay some member of an enemy tribe in order to send he spirit of the slain man to overtake and accompany the spirit of he deceased member of the tribe and to be his companion to the realm of spirits.

The original ceremony was described by Wa-xthí-zhi, who belongs o the great division of the tribe which represents the earth and is called Ho^{n}-ga. The ceremony, when it is used as a mourning rite, was described by Xu-thá-wa-to^{n}-i^{n}, a member of the great division representing the sky, and called Tsí-zhu.

The account of these two ceremonies, the text, the songs, with heir music, the recited parts of the ritual, and the illustrations and diagrams cover 253 pages.

It required much time as well as the exercise of patience to secure he details of these war ceremonies. Particularly was this true of he wí-gi-es (the recited parts), which relate to the traditions of the people, on account of their religious character and the superstititious awe with which the men and women of the tribe regarded them. Deaths have occurred during the study of these rites, and these deaths have been by the people attributed to the reciting of the rituals without regard to the traditional and prescribed rules.

In May, 1918, Mr. La Flesche visited the Osage Reservation for he purpose of completing his investigations of the tattooing rite, which he had started some time ago, and succeeded in securing 22 of the wí-gi-es (the recited parts) from one man at a continuous itting of two days—a remarkable feat of memorizing. Each of these wí-gi-es belongs to a gens of the tribe, the male members of which ecite it at an initiation into the mysteries of the rite or at the ceremony of the actual tattooing. All of these wí-gi-es are recited simultaneously by their owners, and the volume of sound is like that of a responsive reading in a church, with the difference that the reciting is not in unison, as each man recites for himself independently of the others. Fourteen of these wí-gi-es have been transcribed and translated, and they cover about 100 pages of hand-written manuscript.

Besides these 22 wí-gi-es, Mr. La Flesche secured the penalty wí-gi-es owned exclusively by the Thunder gens. He also obtained the penalty wí-gi-e owned in common by the various gentes of the Tsí-zhu division and the one owned by the gentes of the Wa-zhá-zhe and Hoⁿ′-ga subdivisions of the Hoⁿ′-ga great division. These penalty wí-gi-es are recited by their owners to the man who offers himself as a candidate for initiation into the mysteries of either the fasting or the shrine degree of the tribal rites. Like the "sword of Damocles," the penalty hangs over the head of the candidate and drops upon him the moment he violates his initiation obligations, and punishment comes to him by supernatural means. These two wí-gi-es have been transcribed, but are yet to be translated.

While in the office Dr. Truman Michelson, ethnologist, was engaged in correlating the Indian texts of the White Buffalo Dance with the English translation, and revising the latter. He left Washington near the middle of July and, arriving at Tama, Iowa, resumed his field work among the Sauk and Fox. His attention was mainly directed to the esoteric meaning of the songs of the White Buffalo Dance, and to verifying sociological work of the previous season. He obtained the names of nine-tenths of the Fox Indians and obtained information regarding the gens and dual divisions to which their owners belong. A number of ceremonies of these Indians were witnessed and he also learned some facts on Fox eschatology. During his work he purchased a number of sacred packs for the Museum of the American Indian (Heye Foundation), receiving the right to publish by the bureau the information pertaining to them. On leaving Tama, Dr. Michelson proceeded to Mayetta, Kans., to conduct a preliminary survey of the Potawatomi, as it was very clear that the dual divisions of the Sauk and Fox could only be thoroughly understood after that of the Potawatomi was unraveled. Although unable to completely work out the regulations governing membership in the Potawatomi dual divisions, he determined definitely that this division was for ceremonial as well as athletic purposes, as among the Sauk and Fox. He successfully studied the gentile organization of the Potawatomi and obtained a number of folk tales in English which show very clearly that a large body of European (French) element have been absorbed by the Potawatomi and that certain elements of the Plains Indians are present. To account for the distribution of the surviving tales we must assume an early association with the Ojibwa and a later one with the Sauk and Fox group, hich is quite in line with what would be expected on linguistic and istoric grounds. Dr. Michelson returned to Washington in October nd prepared manuscript on a number of miscellaneous topics apperıining to the Fox Indians, to serve as an introduction to the proosed memoir on the White Buffalo Dance, which, with the excep.on of typewriting the Indian texts and the addition of a vocabuıry, is now ready to submit for publication. During the winter dward Davenport, a Fox pupil of the United States Indian School t Carlisle, spent a week in Washington, assisting in a number of oints regarding the memoir.

In the spring Dr. Michelson made a preliminary translation of a ox text of the "owl sacred pack." In June he went to Carlisle nd worked out the dubious points in the translation with this nformant, who dictated the Indian text twice from that in the urrent syllabary, so that the entire text is phonetically restored. The punctuation (with a few exceptions, added later at Tama) of he Indian text and English translation was harmonized.

Dr. Michelson edited Part I of Jones's Ojibwa Texts, containing bout 50 pages, which were published by the American Ethnological Society, and collected the author's proofs of Part II, numbering 750, or a sketch of an Ojibwa grammar which will be offered for publiation by the bureau.

Dr. Michelson has now in press an article in the Journal of inguistics showing that the Pequot-Mohegan belong to the Natick group of the central division of the Algonquian language.

The beginning of the fiscal year found Mr. J. P. Harrington, thnologist, in the field engaged in linguistic studies among the Mission Indians of Ventura County, Cal. At the close of this work, ear the end of September, Mr. Harrington returned to Washington nd spent the following months in the elaboration of recently colected material and his Tanoan and Kiowa notes.

Mr. Harrington has discovered a genetic relationship between the Jto-Aztecan, Tanoan, and Kiowa languages. The last two are so losely related that if the Kiowa had been spoken in New Mexico t would have been classed without hesitation by early writers as a Tanoan language. The Uto-Aztecan is more remotely but not less lefinitely related to the Kiowa genetically. The Kiowa sketch, mounting to 850 typewritten pages, now includes a complete nalysis of all the important features of the language.

On June 9, 1918, Mr. Harrington proceeded to Anadarka, Okla., where he remained until June 26 revising for publication his entire ketch of the Kiowa language, after which he proceeded to Taos, N. Mex.

From July to August 15, 1917, Dr. Leo J. Frachtenberg was engaged in confidential war work for the Department of Justice

(Bureau of Investigation). On his return to the bureau he continued his preliminary work on the grammar and mythology of the Kalapuya Indians of central Oregon begun during the previous fiscal year. He also continued his work of extracting, typewriting, and editing all Kalapuya texts collected by Dr. Gatschet. The mythology of these Indians, who are almost extinct, constitutes a connecting link between the tribes of the coast and those east of the Rocky Mountains. While we possess numerous works dealing with the mythology of the Indians of the northwest coast and of the Great Plains, nothing has yet been published on the folklore of the tribes that inhabit the area between the Coast Range and the Rocky Mountains. Hence a volume on the mythology of the Kalapuya (and also Molala) Indians will be a welcome contribution to our knowledge of the folklore of the North American Indians.

SPECIAL RESEARCHES.

Dr. Franz Boas, honorary philologist, has been engaged in the correction of the proof of part 1 of his volume on the Kwakiutl-English, which has been assigned to the Thirty-fifth Annual Report.

For various reasons part 2 of the Handbook of American Indian Languages has been delayed.

Good progress has been made by Dr. Boas on the dialects and distribution of the Salish Tribe, much work having been done on the maps. This work, which is based on field work supported by Mr. Homer E. Sargent, was almost completed by Dr. Haeberlin, whose unfortunate death has somewhat curtailed the work on these tribes. A very important work on the basketry of the Salish Tribes, funds for which were also provided through the generosity of Mr. Sargent, has made good progress.

Prof. W. H. Holmes, of the National Museum, accompanied by Mr. DeLancey Gill, of the bureau, made a brief visit to the Aberdeen Proving Station, Maryland, where Indian remains had been reported in excavations for Government buildings. He also continued the preparation of the Handbook of American Antiquities, part 1 of which will soon be published as Bulletin 60 of the bureau.

Provision was made out of the appropriations of the Bureau of American Ethnology for a brief archeological reconnaissance in the Walhalla Plateau overlooking the Grand Canyon, from the last of April to the end of the fiscal year. Mr. Neil M. Judd, of the United States National Museum, was detailed for this work. He found remains of prehistoric buildings plentiful along the route of Kanab, Utah, southeastward, in the northern portion of the Kanab forest, at House Rock Valley, and in North, South, and Saddle Canyons. These remains consist usually of one, two, and three room structures constructed of unworked stone blocks. In many instances the foundations of the walls were stones placed on edge, their tops separating the masonry of the roof. Clusters of circular rooms, measuring from 4 to 10 feet in diameter, also occur. The floors of these rooms are generally covered with burnt earth or ashes, mingled with clay that bears impressions of willows and grass, as if parts of roofs similar to those of prehistoric rooms observed along the Colorado River in the San Juan drainage.

Cliff houses also exist in the breaks bordering the Walhalla Plateau, but these are as a rule small single rooms, apparently cists for storage like those built by the people who inhabited the single-room houses in the open, somewhat back from the rim of the canyon. Many small artifacts were found on the cliffs but few fragments of pottery were reported.

Dr. Walter Hough was detailed from the National Museum to begin a study of the ruins in the Tonto Basin, a country of great archeological possibilities, situated between the valleys of the Little Colorado and the Gila. The result of a brief examination of the northern part of this region was encouraging, showing the existence of large ruins in the open as well as cliff houses of considerable size. Dr. Hough also made an examination of several important collections of artifacts, some of which are unique, and enumeration of the ruins visited by him indicates a promising field for future research, which it is the intention of the bureau to prosecute in coming seasons.

Mr. D. I. Bushnell, jr., continued the preparation of the manuscript for the Handbook of Aboriginal Remains East of the Mississippi. The introduction, containing much matter treating of sites, has been completed and will be published in advance of the handbook. It contains a valuable discussion of village sites and cemeteries, treated in a historical manner, with reproductions of old prints and maps.

Dr. A. L. Kroeber has elaborated certain portions of the Handbook of the Indians of California and little remains to be done before it is ready for publication.

The study of Indian music was continued by Miss Frances Densmore throughout the year. She has completed a report on the Ute music, consisting of about 375 pages, and has submitted new material on Ute, Mandan, and Chippewa music. Her account of the Mandan Hidatsa songs contains 400 pages. A new feature has been introduced in the study of the Ute melodies, where she has devised diagrams consisting of curves on a background of coordinate lines. Miss Densmore's main studies have been on ethnobotany of the Chippewa, and include plants used in treatment of the sick and other subjects. The general economic life and the industries of the people were also studied, during which she made an extensive collection, which she has photographed for use in her publications. She has likewise adopted the method of tone photographs designed by Dr. Dayton C. Miller, of the Case School of Applied Science, Cleveland, Ohio.

MANUSCRIPTS.

The following manuscripts, exclusive of those submitted for publication by the bureau, were purchased:

Unique copy of the Journal of Frederick Kurz's Travels through the Western States (in German). In addition to the text (in German) there are two jackets of photographs of original drawings of great historical value.

Six letters on British Guiana written by J. Henry Holmes to his wife, Mary Jane Holmes.

EDITORIAL WORK AND PUBLICATIONS.

On June 30, 1917, Mr. J. G. Gurley resigned his position as editor and Mr. Stanley Searles was appointed to the vacancy July 1. Both editors were assisted by Mrs. Frances S. Nichols. A report of the publication work of the bureau during the fiscal year follows:

Publications issued.

Bulletin 63.—Analytical and Critical Bibliography of the Tribes of Tierra del Fuego and Adjacent Territory, by John M. Cooper. 233 p., 1 pl.

Hawaiian Romance of Laieikawai.—By Martha Warren Beckwith. An advance separate from the Thirty-third Annual Report. 384 p., 5 pl.

Publications in press.

Thirty-second Annual Report.—Accompanying paper: Seneca Fiction, Legends, and Myths (Hewitt and Curtin).

Thirty-third Annual Report.—Accompanying papers: (1) Uses of Plants by the Indians of the Missouri River Region (Gilmore); (2) Preliminary Account of the Antiquities of the Region Between the Mancos and La Plata Rivers in Southwestern Colorado (Morris); (3) Designs on Prehistoric Hopi Pottery (Fewkes); (4) The Hawaiian Romance of Laieikawai (Beckwith).

Thirty-fourth Annual Report.—Accompanying paper: West Indian Antiquities in the Museum of the American Indian (Heye Foundation) (Fewkes).

Thirty-fifth Anual Report.—Accompanying paper: Ethnology of the Kwakiutl (Boas).

Bulletin 59.—Kutenai Tales (Boas).

Bulletin 60.—Handbook of Aboriginal American Antiquities—Part 1 (Holmes).

Bulletin 61.—Teton Sioux Music (Densmore).

Bulletin 64.—The Maya Indians of Southern Yucatan and Northern British Honduras (Gann).

Bulletin 65.—Archeological Explorations in Northeastern Arizona (Kidder and Guernsey).

Bulletin 66.—Recent Discoveries of Remains Attributed to Early Man in America (Hrdlička).

Bulletin 67.—Alsea Texts and Myths (Frachtenberg).

DISTRIBUTION OF PUBLICATIONS.

'he distribution of the publications has been continued under the
ıediate charge of Miss Helen Munroe, assisted in the opening
ıths of the year by Miss Ora A. Sowersby, stenographer and type-
ter, and later by Miss Emma B. Powers, Miss Sowersby having
n transferred to the Bureau of American Ethnology.

'ublications were distributed as follows:

	Copies.
ual reports and separates	1,760
etins and separates	5,460
tributions to North American Ethnology (volumes and separates)	7
oductions	5
ellaneous publications	106
Total	7,344

ᴌs compared with the fiscal year 1917, there was a decrease of
l0 in the total number of publications distributed. This was due
the fact that during the fiscal year 1917 four publications were
t out to the mailing list, whereas in the fiscal year 1918 only Bul-
n 63 was distributed to the list. Twenty addresses have been
led to the mailing list during the year and 15 dropped, making a
increase of 5.

ILLUSTRATIONS.

ſr. De Lancey Gill, with the assistance of Mr. Albert E. Sweeney,
tinued the preparation of the illustrations required for the pub-
tions of the bureau and devoted the usual attention to photo-
phing visiting Indians. A summary of this work is as follows:

atives of ethnologic and archeologic subjects	271
tographic prints for distribution and office use	525
tostat prints from books and manuscripts	300
nts used	800
wings and photographs prepared for publication as illustrations	517
stration proofs read	400
rait negatives of visiting Indians	15

LIBRARY.

'he reference library of the bureau continued in the immediate
e of Miss Ella Leary, assisted by Mr. Charles B. Newman.

'here was presented to the library by Dr. J. Walter Fewkes the
lex Hopiensis, consisting of three bound volumes of colored
tures of Hopi Katcinas made by a Hopi Indian in 1900. This
he material on which was based the article "Hopi Katcinas" in
Twenty-first Annual Report of the Bureau of American Eth-
ogy.

)uring the year 430 books were accessioned, of which 148 were
uired by purchase, 84 by binding periodicals, and 198 by gifts and

exchanges. The periodicals currently received number about 760, of which 16 were received by subscription and 744 by gifts and exchange. We have also received 200 pamphlets, giving us at the close of the year a working library of 22,180 volumes, about 14,048 pamphlets, and several thousand periodicals.

During the year there were sent to the bindery 142 volumes, and 84 bound volumes were received.

In continuance of the policy of increasing the library by exchange and filling in incomplete sets, letters were written for new exchanges and for completing series already in the library. We have been able to secure by this means many valuable and important acquisitions.

In addition to the regular routine of cataloguing, classification, ordering from book dealers, making up for binding, and keeping the serial and accession records, the efforts of the librarian were devoted to making a subject, author, and analytical catalogue of books that are represented in the old catalogue under the author only.

During the year there was an increasing number of students not connected with the Smithsonian Institution who found the library of service in seeking volumes not obtainable in other libraries of the city. The library was used also by the Library of Congress and officers of the executive departments, and out-of-town students have called upon the library for loans during the year.

In addition to the use of its own library it was found necessary to draw on the Library of Congress from time to time for the loan of about 450 volumes. Numerous typewritten bibliographic lists have been made for correspondents of the bureau and the Smithsonian Institution.

The Monthly Bulletin for the use of the bureau staff has been continued throughout the year.

COLLECTIONS.

The following collections acquired by members of the staff of the Bureau, or by those detailed in connection with its researches, have been transferred to the U. S. National Museum:

Seven baskets made by the Koasati Indians of Louisiana, collected by Dr. John R. Swanton. (61315.)

A roughly chipped implement of gray limestone from British Guiana, presented by Dr. Walter E. Roth. (61325.)

Six ethnological specimens of the Mandan Sioux, Ute, and Chippewa Indians, purchased from Miss Frances Densmore. (61573.)

A loom of the Osage Indians, collected by Mr. Francis La Flesche. (62013.)

Twelve specimens of plants from Minnesota, collected by Miss Frances Densmore. (62190.)

Twenty-five stone objects from the Huastec region, Mexico, pı nted to the bureau by Mr. John M. Muir, Tampico, Mexi(›2253.)

Arrowpoints, spearheads (18) collected by Dr. John R. Swant the vicinity of Rock Hill, S. C. (62577.)

PROPERTY.

Furniture was purchased to the amount of $107.02; the cost ·pewriting machines was $175, making a total of $282.02.

MISCELLANEOUS.

Quarters.—Two rooms on the third floor of the north tower of t mithsonian Building, occupied by the bureau, were painted; also t ffice of the chief. A glass partition was erected on the south fro f the space occupied by the librarian as an office, in order to rend ıe office more comfortable during the winter months. Three e ırged photographs of Spruce-tree House, Mesa Verde Natior 'ark, before and after repair, were painted and hung in the office he chief.

Personnel.—Changes in the personnel of the bureau during t ıst fiscal year were as follows:

Mr. F. W. Hodge, ethnologist in charge, resigned February 918, and Dr. J. Walter Fewkes succeeded him, with the title of chi larch 1, 1918. Dr. Leo J. Frachtenberg's official connection wi he bureau terminated October 30, 1917. Mr. Stanley Searles w ppointed editor July 1, 1917. Miss Florence M. Poast, clerk to M Iodge, resigned October 15, 1917; Miss Ora A. Sowersby, a s ographer and typewriter in the service of the bureau, was assign o that position November 1, 1918. The vacancy created by tl hange was filled by the appointment of Miss E. B. Powers, Nove er 5, 1917.

Clerical.—The correspondence and other clerical work of the offi ıcluding the copying of manuscripts, has been conducted with t id of Miss Florence M. Poast and Miss Ora A. Sowersby, clerks ıe ethnologist in charge, and later by Miss M. S. Clark, serving rivate secretary to the chief. Mrs. Frances S. Nichols assisted t litor.

Respectfully, yours,

J. Walter Fewkes,
Chief.

Dr. Charles D. Walcott,
Secretary of the Smithsonian Institution.

APPENDIX 3.

REPORT ON THE INTERNATIONAL EXCHANGES.

SIR: I have the honor to submit the following report on the operations of the International Exchange Service during the fiscal year ending June 30, 1918:

The estimate submitted by the institution for carrying on the service during the year was $35,000. This amount was granted by Congress, and, in addition, an allotment of $200 was made for printing and binding. The various governmental departments and other establishments paid the Smithsonian Institution for the transportation of exchanges $2,345.18, thus making the total available resources for carrying on the system of exchanges $37,545.18.

The total number of packages handled during the year 1918 was 266,946. The weight of these packages was 182,825 pounds.

The number and weight of the packages of different classes are indicated in the following table:

	Packages.		Weight.	
	Sent.	Received.	Sent.	Received.
			Pounds.	*Pounds.*
United States parliamentary documents sent abroad	180,967	....	64,906	....
Publications received in return for parliamentary documents	....	1,093	....	2,499
United States departmental documents sent abroad	51,506	....	50,634	....
Publications received in return for departmental documents	....	1,981	....	3,373
Miscellaneous scientific and literary publications sent abroad	23,026	....	40,509	....
Miscellaneous scientific and literary publications received from abroad for distribution in the United States	....	8,373	....	20,904
Total	255,499	11,447	156,049	26,776
Grand total	266,946		182,825	

The disparity between the number of packages dispatched and those received is not so great as indicated by the figures in the foregoing table. Packages sent abroad usually contain only a single publication each, while those received in return often comprise several volumes. It is also a fact that many returns for publications sent abroad reach their destinations direct by mail and not through the exchange service.

So far as the Institution has been advised, only three consignments of exchanges have been lost through hostile action since the beginning of the war. Information has been received from the Portuguese exchange service to the effect that the three boxes forwarded to that service in September, 1916, per steamship *Balto* were lost when that vessel was wrecked at sea. In reporting this loss the Portuguese exchange service does not state whether the vessel was sunk by the enemy.

The box of exchanges for the Jewish Agricultural Experiment Station, Haifa, Palestine, which the Egyptian Government publications office at Bulaq kindly agreed to hold until the cessation of hostilities, has been forwarded to its destination by that office. The attention given to this matter by the Government publications office and the trouble taken to reforward the consignment to its destination are much appreciated by the Institution.

New regulations adopted by the United States War Trade Board governing importations into the United States from Great Britain made it necessary for the Smithsonian agents in London to take out a consular invoice for shipments sent to the Institution, giving the full title of each book. The matter was brought to the attention of the Director of the Bureau of Imports of the War Trade Board, who very kindly issued a general license to cover the importation of international exchanges from the United Kingdom when consigned to the Smithsonian Institution. This action has not only resulted in expediting shipments from England, but has relieved the depleted force of the London Exchange Agency of a great deal of labor in connection with the forwarding of shipments to this country.

Aid has, as in previous years, been rendered to various governmental and scientific establishments in this and foreign countries in procuring desired publications. One instance in this connection may be referred to here. A request was received through diplomatic channels from the recently created French War Museum-Library, at Paris, for copies of American documents and other material relating to the war for deposit in a section of that library to be devoted to the part taken by the United States in the conflict. The Institution has taken the matter up with the several governmental establishments, and has received a number of publications for the abovementioned library. Prof. Adolphe Cohn, of Columbia University, New York, is the American representative of the French War Museum-Library, and will take steps to procure publications and material from organizations outside of the Government.

Only 443 boxes of exchanges were forwarded abroad during the year. This does not represent an actual falling off in the number of packages distributed abroad, as many were sent to their destinations direct by mail. This method of transmission was adopted because it was found much cheaper to mail the packages than to forward them in boxes, owing to the great advance in ocean freight rates. Of the total boxes transmitted 103 contained full set United States official documents to authorized depositories. shipment of boxes containing the series of governmental docum was suspended during the latter half of the fiscal year, and will be resumed until regular consignments are again forwarded to distributing agencies.

The dates of transmission of the 443 boxes forwarded to for countries is shown in the following table:

Consignments of exchanges for foreign countries.

Country.	Number of boxes.	Date of transmission.
Argentina	18	Sept. 5, Nov. 3, 1917; Apr. 2, 1918.
Bolivia	1	Sept. 8, 1917.
Brazil	15	Sept. 5, Nov. 7, 1917; Apr. 8, 1918.
British colonies	4	July 28, Aug. 25, Oct. 3, Dec. 22, 1917.
British Guiana	1	Sept. 11, 1917.
Canada	16	Aug. 30, Nov. 21, 1917; Feb. 12, May 31, 1918.
Chile	11	Sept. 6, Nov. 9, 1917; Apr. 2, 1918.
China	13	Aug. 17, Oct. 5, Nov. 22, 1917; Mar. 31, 1918.
Colombia	9	Sept. 7, Nov. 12, 1917.
Costa Rica	2	Nov. 14, 1917.
Cuba	4	Aug. 30, Nov. 21, 1917; Feb. 12, May 31, 1918.
Denmark	4	Aug. 4, 1917.
Ecuador	2	Sept. 8, 1917.
France	32	Aug. 2, Sept. 27, 1917.
Great Britain and Ireland	104	July 28, Aug. 25, Oct. 3, Dec. 22, 1917.
Guatemala	1	July 28, 1917.
Haiti	3	Sept. 7, Nov. 14, 1917; Apr. 1, 1918.
Honduras	1	Sept. 8, 1917.
India	11	July 28, Aug. 25, Oct. 3, Dec. 22, 1917.
Italy	26	Aug. 23, Oct. 20, Dec. 28, 1917.
Jamaica	1	Sept. 14, 1917.
Japan	34	Oct. 10, 1917; Jan. 8, May 7, 1918.
Mexico	4	Aug. 30, Nov. 21, 1917; Feb. 12, May 31, 1918.
New South Wales	18	Sept. 16, Nov. 13, 1917; Apr. 2, 1918.
New Zealand	9	Sept. 28, 1917; Nov. 21, Apr. 2, 1918.
Nicaragua	1	Sept. 8, 1917.
Paraguay	2	Do.
Peru	8	Sept. 8, Nov. 10, 1917; Apr. 2, 1918.
Portugal	4	Aug. 4, Oct. 16, 1917.
Queensland	4	Sept. 20, Nov. 21, 1917; Apr. 2, 1918.
Salvador	1	Sept. 8, 1917.
Siam	1	Sept. 12, 1917.
South Australia	11	Sept. 19, Nov. 17, 1917; Apr. 2, 1918.
Spain	12	Aug. 13, Oct. 12, 1917; Jan. 9, 1918.
Switzerland	5	Aug. 10, 1917.
Tasmania	5	July 28, Aug. 25, Dec. 22, 1917.
Union of South Africa	9	Aug. 18, Dec. 7, 1917.
Uruguay	10	Sept. 6, Nov. 10, 1917; Apr. 2, 1918.
Venezuela	6	Sept. 6, Nov. 12, 1917; Apr. 2, 1918.
Victoria	14	Sept. 18, Nov. 16, 1917; Apr. 15, 1918.
Western Australia	6	July 28, Aug. 23, Dec. 22, 1917.

FOREIGN DEPOSITORIES OF UNITED STATES GOVERNMENTAL DOCUMENTS.

Ninety-one sets of United States governmental documents were ceived during the year for distribution to the following depositories:

DEPOSITORIES OF FULL SETS.

GENTINA: Ministerio de Relaciones Exteriores, Buenos Aires.
STRALIA: Library of the Commonwealth Parliament, Melbourne.
STRIA: K. K. Statistische Zentral-Kommission, Vienna.
DEN: Universitäts-Bibliothek, Freiburg. (Depository of the Grand Duchy of Baden.)
VARIA: Königliche Hof- und Staats-Bibliothek, Munich.
LGIUM: Bibliothèque Royale, Brussels.
AZIL: Bibliotheca Nacional, Rio de Janeiro.
ENOS AIRES: Biblioteca de la Universidad Nacional de La Plata. (Depository of the Province of Buenos Aires.)
NADA: Library of Parliament, Ottawa.
ILE: Biblioteca del Congreso Nacional, Santiago.
INA: American-Chinese Publication Exchange Department, Shanghai Bureau of Foreign Affairs, Shanghai.
LOMBIA: Biblioteca Nacional, Bogotá.
STA RICA: Oficina de Depósito y Canje Internacional de Publicaciones, San José.
BA: Secretaria de Estado (Asuntos Generales y Canje Internacional), Habana.
NMARK: Kongelige Bibliotheket, Copenhagen.
GLAND: British Museum, London.
ANCE: Bibliothèque Nationale, Paris.
RMANY: Deutsche Reichstags-Bibliothek, Berlin.
ASGOW: City Librarian, Mitchell Library, Glasgow.
EECE: Bibliothèque Nationale, Athens.
ITI: Secrétaire d'État des Relations Extérieures, Port au Prince.
NGARY: Hungarian House of Delegates, Budapest.
DIA: Imperial Library, Calcutta.
ELAND: National Library of Ireland, Dublin.
ALY: Biblioteca Nazionale Vittorio Emanuele, Rome.
PAN: Imperial Library of Japan, Tokyo.
NDON: London School of Economics and Political Science. (Depository of the London County Council.)
ANITOBA: Provincial Library, Winnipeg.
EXICO: Instituto Bibliográfico, Biblioteca Nacional, Mexico.
THERLANDS: Library of the States General, The Hague.
W SOUTH WALES: Public Library of New South Wales, Sydney.
W ZEALAND: General Assembly Library, Wellington.
RWAY: Storthingets Bibliothek, Christiania.
TARIO: Legislative Library, Toronto.
RIS: Préfecture de la Seine.
RU: Biblioteca Nacional, Lima.
RTUGAL: Bibliotheca Nacional, Lisbon.
USSIA: Königliche Bibliothek, Berlin.
EBEC: Library of the Legislature of the Province of Quebec, Quebec.

QUEENSLAND: Parliamentary Library, Brisbane.
RUSSIA: Imperial Public Library, Petrograd.
SAXONY: Königliche Oeffentliche Bibliothek, Dresden.
SERBIA: Section Administrative du Ministère des Affaires Étrangères, Belgrade.
SOUTH AUSTRALIA: Parliamentary Library, Adelaide.
SPAIN: Servicio del Cambio Internacional de Publicaciones, Cuerpo Facultativo de Archiveros, Bibliotecarios y Arqueólogos, Madrid.
SWEDEN: Kungliga Biblioteket, Stockholm.
SWITZERLAND: Bibliothèque Fédérale, Berne.
TASMANIA: Parliamentary Library, Hobart.
TURKEY: Department of Public Instruction, Constantinople.
UNION OF SOUTH AFRICA: State Library, Pretoria, Transvaal.
URUGUAY: Oficina de Canje Internacional de Publicaciones, Montevideo.
VENEZUELA: Biblioteca Nacional, Caracas.
VICTORIA: Public Library, Melbourne.
WESTERN AUSTRALIA: Public Library of Western Australia, Perth.
WÜRTTEMBERG: Königliche Landesbibliothek, Stuttgart.

DEPOSITORIES OF PARTIAL SETS.

ALBERTA: Provincial Library, Edmonton.
ALSACE-LORRAINE: K. Ministerium für Elsass-Lothringen, Strassburg.
BOLIVIA: Ministerio de Colonización y Agricultura, La Paz.
BREMEN: Senatskommission für Reichs- und Auswärtige Angelegenheiten.
BRITISH COLUMBIA: Legislative Library, Victoria.
BRITISH GUIANA: Government Secretary's Office, Georgetown, Demerara.
BULGARIA: Minister of Foreign Affairs, Sofia.
CEYLON: Colonial Secretary's Office (Record Department of the Library), Colombo.
ECUADOR: Biblioteca Nacional, Quito.
EGYPT: Bibliothèque Khédiviale, Cairo.
FINLAND: Chancery of Governor, Helsingfors.
GUATEMALA: Secretary of the Government, Guatemala.
HAMBERG: Senatskommission für die Reichs- und Auswärtigen Angelegenheiten.
HESSE: Grossherzogliche Hof-Bibliothek, Darmstadt.
HONDURAS: Secretary of the Government, Tegucigalpa.
JAMAICA: Colonial Secretary, Kingston.
LIBERIA: Department of State, Monrovia.
LOURENÇO MARQUEZ: Government Library, Lourenço Marquez.
LÜBECK: President of the Senate.
MADRAS, PROVINCE OF: Chief Secretary to the Government of Madras, Public Department, Madras.
MALTA: Lieutenant Governor, Valetta.
MONTENEGRO: Ministère des Affaires Étrangères, Cetinje.
NEW BRUNSWICK: Legislative Library, Fredericton.
NEWFOUNDLAND: Colonial Secretary, St. John's.
NICARAGUA: Superintendente de Archivos Nacionales, Managua.
NORTHWEST TERRITORIES: Government Library, Regina.
NOVA SCOTIA: Provincial Secretary of Nova Scotia, Halifax.
PANAMA: Secretaria de Relaciones Exteriores, Panama.
PARAGUAY: Oficina General de Inmigracion, Asuncion.
PRINCE EDWARD ISLAND: Legislative Library, Charlottetown.
ROUMANIA: Academia Romana, Bucharest.
SALVADOR: Ministerio de Relaciones Exteriores, San Salvador.

tment of Foreign Affairs, Bangkok.
EMENTS: **Colonial Secretary, Singapore.**
NCES OF AGRA AND OUDH: **Under Secretary to Government, Alla-**

germeister der Haupt- und Residenz-Stadt.

ARLIAMENTARY EXCHANGE OF OFFICIAL JOURNALS.

te list of the countries which have entered into the Inter-ry Exchange of Official Journals with the United States low. The Congressional Records for those countries to not possible to forward consignments at present are being Institution.

public.
Province of.

France.
Great Britain.
Greece.
Guatemala.
Honduras.
Hungary.
Italy.
Liberia.
New South Wales.
New Zealand.
Peru.
Portugal.

Prussia.
Queensland.
Roumania.
Russia.
Serbia.
Spain.
Switzerland.
Transvaal.
Union of South Africa.
Uruguay.
Venezuela.
Western Australia.

FOREIGN EXCHANGE AGENCIES.

ents for India, instead of being forwarded through the in London as formerly, are now sent directly to the Su-t of Stationery at Bombay, which has been designated as ment to undertake the distribution of exchanges in that his change was made at the request of the Under-Secre-e for India in London.

given a complete list of the foreign exchange agencies
:

France.
ortugal.
Comisión Protectora de Bibliotecas Populares, Santa Fé 880,
es.
K. Statistische Zentral-Kommission, Vienna.
ortugal.
vice Belge des Échanges Internationaux, Rue des Longs-Chariots

ina Nacional de Estadística, La Paz.
iço de Permutações Internacionaes, Bibliotheca Nacional, Rio de

NIES: Crown Agents for the Colonies, London.
NA: Royal Agricultural and Commercial Society, Georgetown.
URAS: Colonial Secretary, Belize.
stitutions Scientifiques de S. M. le Roi de Bulgarie, Sofia.
DS, *via* Spain.
io de Canjes Internacionales, Biblioteca Nacional, Santiago.

China: American-Chinese Publication Exchange Department, Shanghai Bureau of Foreign Affairs, Shanghai.

Colombia: Oficina de Canjes Internacionales y Reparto, Biblioteca Nacional, Bogotá.

Costa Rica: Oficina de Depósito y Canje Internacional de Publicaciones, San José.

Denmark: Kongelige Danske Videnskabernes Selskab, Copenhagen.

Dutch Guiana: Surinaamsche Koloniale Bibliotheek, Paramaribo.

Ecuador: Ministerio de Relaciones Exteriores, Quito.

Egypt: Government Publications Office, Printing Department, Cairo.

France: Service Français des Échanges Internationaux, 110 Rue de Grenelle, Paris.

Germany: Amerika-Institut, Berlin, N. W. 7.

Great Britain and Ireland: Messrs. William Wesley & Son, 28 Essex Street, Strand, London.

Greece: Bibliothèque Nationale, Athens.

Greenland, *via* Denmark.

Guadeloupe, *via* France.

Guatemala: Instituto Nacional de Varones, Guatemala.

Guinea, *via* Portugal.

Haiti: Secrétaire d'État des Relations Extérieures, Port au Prince.

Honduras: Biblioteca Nacional, Tegucigalpa.

Hungary: Dr. Julius Pikler, Municipal Office of Statistics, Váci-utca 80, Budapest.

Iceland, *via* Denmark.

India: Superintendent of Stationery, Bombay.

Italy: Ufficio degli Scambi Internazionali, Biblioteca Nazionale Vittorio Emanuele, Rome.

Jamaica: Institute of Jamaica, Kingston.

Japan: Imperial Library of Japan, Tokyo.

Java, *via* Netherlands.

Korea: Government General, Keijo.

Liberia: Bureau of Exchanges, Department of State, Monrovia.

Lourenço Marquez: Government Library, Lourenço Marquez.

Luxemburg, *via* Germany.

Madagascar, *via* France.

Madeira, *via* Portugal.

Montenegro: Ministère des Affaires Étrangères, Cetinje.

Mozambique, *via* Portugal.

Netherlands: Bureau Scientifique Central Néerlandais, Bibliothèque de l'Université, Leyden.

New Guinea, *via* Netherlands.

New South Wales: Public Library of New South Wales, Sydney.

New Zealand: Dominion Museum, Wellington.

Nicaragua: Ministerio de Relaciones Exteriores, Managua.

Norway: Kongelige Norske Frederiks Universitet Bibliotheket, Christiania.

Panama: Secretaria de Relaciones Exteriores, Panama.

Paraguay: Servicio de Canje Internacional de Publicaciones, Sección Consular y de Comercio, Ministerio de Relaciones Exteriores, Asuncion.

Persia: Board of Foreign Missions of the Presbyterian Church, New York City.

Peru: Oficino de Reparto, Depósito y Canje Internacional de Publicaciones, Ministerio de Fomento, Lima.

Portugal: Serviço de Permutações Internacionaes, Inspecção Geral das Bibliothecas e Archivos Publicos, Lisbon.

Queensland: Bureau of Exchanges of International Publications, Chief Secrectary's Office, Brisbane.

Roumania: Academia Romana, Bucharest.

Russia: Commission Russe des Échanges Internationaux, Bibliothèque Impériale Publique, Petrograd.

Salvador: Ministerio de Relaciones Exteriores, San Salvador.

Serbia: Section Administrative du Ministère des Affaires Étrangères, Belgrade.

Siam: Department of Foreign Affairs, Bangkok.

South Australia: Public Library of South Australia, Adelaide.

Spain: Servicio del Cambio Internacional de Publicaciones, Cuerpo Facultativo de Archiveros, Bibliotecarios y Arqueólogos, Madrid.

Sumatra, *via* Netherlands.

Sweden: Kongliga Svenska Vetenskaps Akademien, Stockholm.

Switzerland: Service des Échanges Internationaux, Bibliothèque Fédérale Centrale, Berne.

Syria: Board of Foreign Missions of the Presbyterian Church, New York.

Tasmania: Secretary to the Premier, Hobart.

Trinidad: Royal Victoria Institute of Trinidad and Tobago, Port-of-Spain.

Tunis, via France.

Turkey: American Board of Commissioners for Foreign Missions, Boston.

Union of South Africa: Government Printing Works, Pretoria, Transvaal.

Uruguay: Oficina de Canje Internacional, Montevideo.

Venezuela: Biblioteca Nacional, Caracas.

Victoria: Public Library of Victoria, Melbourne.

Western Australia: Public Library of Western Australia, Perth.

Windward and Leeward Islands: Imperial Department of Agriculture, Bridgetown, Barbados.

Respectfully submitted.

C. W. Shoemaker,
Chief Clerk, International Exchange Service.

Dr. Charles D. Walcott,
Secretary of the Smithsonian Institution.
August 26, 1918.

APPENDIX 4.

REPORT ON THE NATIONAL ZOOLOGICAL PARK.

SIR: I have the honor to present the following report on the operations of the National Zoological Park for the fiscal year ending June 30, 1918:

The sum of $100,000 was provided by Congress in the sundry civil act for all expenses except printing and binding, for which an additional allotment of $200 was made. Virtually the entire appropriation was needed for actual maintenance, the cost of which continues to increase from year to year, and only small sums could be expended on necessary repairs or minor permanent improvements. There has been difficulty throughout the year in keeping the required number of employees in all departments of the force, while the resources of the park have been taxed to the utmost to care properly for the greatly increased number of visitors. Notwithstanding the difficulties of the wild-animal trade and the great reduction in the number of specimens reaching this country from abroad, the collections have been kept up to a fair standard in numbers without serious gaps, and the popular and scientific value of the exhibition has not been impaired.

ACCESSIONS.

Gifts.—There were added to the collection by gift a total number of 103 animals. The list includes many valuable and important accessions, among them several species not previously exhibited in the park.

The first specimen of the glacier bear (*Ursus emmonsii*) ever known to have been captured alive was received at the park July 25, 1917, as a gift from Mr. Victor J. Evans, of Washington, D. C., who has made many donations to the collection in past years. The glacier bear, or blue bear as it is sometimes called, has a very limited distribution in the region of the St. Elias Alps, near Yakutat Bay, Alaska. It was first described in 1895 and since that time only one or two skins have been brought into Yakutat by the Indians each year. The specimen secured by Mr. Evans was captured as a small cub by an Indian at the head of Disenchantment Bay, a continuation of Yakutat Bay, about the middle of May, 1916, and was soon after sold to a trader in Yakutat. As one of the rarest and least known of the great game animals of America, the glacier bear has, since its discovery, been watched for eagerly by the officials of zoological gardens.

The New Zealand Government, through Mr. Ben Wilson of the Department of Tourist and Health Resorts, made to the park the most valuable gifts of birds received during the year. These included six keas, or sheep-killing parrots (*Nestor notabilis*), and eight wekas, or flightless rails (*Ocydromus*) from South Island, New Zealand. The keas are beautiful and interesting parrots of large size which inhabit the high mountains of New Zealand. Some individuals of the species have developed the habit of killing sheep and as a consequence the birds have been greatly reduced in numbers by the stockmen. A large outdoor cage with shelter attached was constructed near the bird house and the keas have attracted great attention. They are utterly unmindful of the cold, and during the unusually severe weather of last winter they played in the snow and bathed in icy water. The wekas, of which three species are represented in the collection, are members of the group of rails notable for their imperfectly developed wings. They are of the size of a well-grown pullet and are mischievous and quarrelsome even among others of their kind. Unlike their relatives in North America they are not aquatic, but inhabit dry woods and scrub.

Two interesting collections of Trinidad snakes were received from Mrs. James Birch Rorer and from Hon. Henry D. Baker, Trinidad, British West Indies. Included in the lot from Mr. Baker was a large boa constrictor nearly 11 feet in length.

Among the miscellaneous donations for the past year were some valuable parrots from individuals as noted below. Not less than six species of amazons, of which the white-fronted (*Amazona albifrons*), yellow-cheeked (*Amazona autumnalis*), and Santo Domingo (*Amazona ventralis*) were new to the collection, were received in this manner. The Brazilian green macaw and Haitian paroquet were also previously unrepresented.

The complete list of donors and gifts is as follows:

Mr. Norman Anderson, Washington, D. C., alligator.

Mr. G. Gordon Bailey, Washington, D. C., red-tailed hawk.

Hon. Henry D. Baker, Trinidad, British West Indies, boa constrictor, tree boa, three lora snakes, and three water coral snakes.

Mrs. Barefield, Washington, D. C., Cuban parrot.

Mr. J. Barnes, Washington, D. C., alligator.

Maj. E. R. Beadle, Paris Island, S. C., peacock.

Miss Pearl Beard, Herndon, Va., American crow.

Mr. William Blum, Chevy Chase, Md., opossum.

Mr. S. Howe Bonar, Moundsville, W. Va., great horned owl.

Mr. C. F. Borden, Brookland, D. C., white-fronted parrot.

Mr. J. T. Boston, Washington, D. C., American coot.

Mrs. J. Bourke, Washington, D. C., two alligators.

Mrs. C. V. Brooks, Del Ray, Va., alligator.

Mr. Bobby Bulkley, Chevy Chase, D. C., alligator.

Mr. Willard Burton, Washington, D. C., alligator.

Camp Meigs Band, Quartermaster Corps, United States Army, Washington, D. C., turkey.

Mr. James L. Chase, Washington, D. C., yellow-cheeked parrot.

Mr. Waldo A. Clarke, Washington, D. C., opossum.

Miss Pauline Corson, Guinea Mills, Va., raccoon.

Mrs. M. B. Crawford, Washington, D. C., yellow-headed parrot and two double yellow-head parrots.

Mr. Ernest W. Davis, Asheville, N. C., Margarita capuchin.

Department of Tourist and Health Resorts, New Zealand Government, through Mr. Ben Wilson, six kea parrots and eight weka rails.

Mr. Victor J. Evans, Washington, D. C., glacier bear.

Mr. L. R. Grabill, Takoma Park, D. C., alligator.

Miss Catherine N. Hinton, Petersburg, Va., white-throated capuchin.

Mr. A. B. Hodges, Washington, D. C., alligator.

Mr. A. V. Hoffman, Washington, D C., Brazilian green macaw.

Lieut. C. D. Holland, Washington, D. C., two double yellow-head parrots.

Mr. J. M. Horton, Washington, D. C., alligator.

Mr. C. E. Hunt, Washington, D. C., two mourning doves.

Mr. T. A. James, Augusta, Me., two black ducks.

Mr. F. H. Johnson, Washington, D. C., two alligators.

Mr. E. S. Joseph, Sydney, Australia, dingo, two Tasmanian phalangers, two stump-tailed lizards, and three blue-tongued lizards.

Mr. C. Herbert Kreh, Frederick, Md., copperhead.

Krey, Price & Co., Washington, D. C., bald eagle.

Miss F. I. Latham, Brookland, D. C., bobwhite.

Mr. C. C. Lets, Chevy Chase, D. C., water snake.

Mrs. Macklehaney, Washington, D. C., alligator.

Mr. R. H. Macneil, Washington, D. C., alligator.

Mr. William M. Mann, Washington, D. C., crocodile.

Mrs. John H. McChesney, Washington, D. C.. Haitian paroquet and Santo Domingo parrot.

Mrs. F. McManamy, Chevy Chase, Md., screech owl.

Mrs. Thomas P. Morgan, Washington, D. C., Philippine macaque.

Mr. H. A. O'Dwyer, Washington, D. C., barred owl.

Mrs. Charles Parks, Washington, D. C., albino squirrel.

Mr. A. H. Peterson, Washington, D. C., screech owl.

Mr. J. S. Rector, McLean, Va., barred owl.

Mrs. C. S. Rockwood, Washington, D. C., ring-necked duck.

Mrs. James Birch Rorer, Trinidad, British West Indies, anaconda, lora snake, and slug-eating snake.

Mr. Charles E. Schaffner, Washington, D. C., canvasback duck.

Mr. Milford Schwartz, Washington, D. C., barred owl.

Mrs. J. V. Shipp, Chevy Chase, D. C., Cuban parrot.

Miss Marjorie Smith, Fort Meyer Heights, Va., alligator.

Mrs. T. K. Smith, Washington, D. C., alligator.

Mr. J. E. Taylor, Oxford, Md., red fox.

Mr. Joseph Turner, Washington, D. C., black bear.

Mrs. Frank Walter, Washington, D. C., yellow-headed parrot.

Mr. F. L. Waters, Washington, D. C., two alligators.

Mr. Alexander Wetmore, Washington, D. C., American crow.

Mr. Walter L. Whitney, Takoma Park, D. C., coyote.

Mr. Bertram Wills, Washington, D. C., two alligators.

Hon. Woodrow Wilson, Washington, D. C., turkey.
Mr. Nelson R. Wood, Washington, D. C., cedar waxwing.
Mr. E. S. Wright, Lassiter, Va., black-crowned night heron.

In addition to the vertebrate animals listed above and regularly catalogued in the collection, a most interesting exhibit of crabs was maintained throughout most of the year. The specimens were presented by the collector, Dr. Paul Bartsch, of the National Museum, and comprised 69 West Indian hermit crabs (*Cœnobita clypeata*) from Bush Key, and 37 West Indian land crabs (*Gecarcinus materalis*) from Loggerhead Key, Dry Tortugas, Fla. Some specimens of the work of beavers, stumps and cuttings made by the animals in the construction of dams and lodges, were collected in the Adirondacks, and presented to the Park by Mr. W. E. Talmage, of Cleveland, Ohio. Arranged on a stand constructed for the purpose in the beaver inclosure, they have added greatly to the interest of the public in this animal and its work.

Births.—Sixty-three mammals were born, and 45 birds were hatched during the year. The births include 1 Brazilian tapir, 1 yak, 2 bison, 2 Rocky Mountain sheep, 2 nilgais, 1 black buck, 2 guanacos, 3 llamas, 1 black-tailed deer, 1 Virginia deer, 1 Manchurian deer, 2 American elk, 5 red deer, 1 fallow deer, 4 axis deer, 2 hog deer, 4 Japanese deer, 1 barasingha deer, 4 great red kangaroos, 1 brush-tailed rock kangroo, 1 rufous-bellied wallaby, 1 common phalanger, 2 Tasmanian phalangers, 4 raccoons, 9 coypus, 1 paca, 2 Peruvian wild guinea-pigs, and 2 rhesus monkeys. The birds hatched include Canada geese, wood ducks, mallards, East Indian black ducks, American coots, cormorants, night herons, and peafowls.

The tapir, born February 22, is the ninth young reared in the park since 1903 from a single pair of animals.

Exchanges.—In exchange for surplus animals born in the park there were received during the year 11 mammals, 25 birds, and 6 reptiles. Some valuable additions were made to the collections from this source, including a female Manchurian tiger, a young Himalayan bear, a blesbok, two striped hyenas, and a number of Australian mammals, birds, and reptiles. A pair of straw-necked ibises (*Carphibis spinicollis*), the first of the species ever shown in the park, was received in May.

Purchases.—The only mammals purchased during the year were 12 prairie-dogs to restock the "dog town," the population of which had been greatly reduced in numbers, and one specimen of the Arizona mountain sheep. Birds to the number of 104, mostly waterfowl and small aviary species, were added to the collection by purchase. Perhaps the most noteworthy accession by purchase among the birds is a pair of thick-billed parrots (*Rhynchopsitta pachyrhyncha*) from the Chiracahua Mountains of Arizona. This species is the only member of the order of parrots, excepting the almost extinct Carolina paroquet, known to occur within the United States. At intervals a number of years apart flights of thick-bills appear in the mountains of southern Arizona, coming from Mexico. The birds obtained for the park were captured in January in the pine forested Chiracahuas, when the ground in the higher altitudes where the birds occur was covered with snow. A single reptile, a rattlesnake, was purchased during the year.

Transfers.—The Biological Survey of the Department of Agriculture, as in the past, contributed to the collection by the transfer of a number of specimens captured by field agents of the bureau. Seven plains wolves, including one black wolf, were received from Montana, Wyoming, and Utah. From New Mexico the Biological Survey sent a specimen each of the western horned owl, ferruginous rough-leg hawk, and Abert's squirrel.

Captured in the park.—Three mammals, five birds, and one reptile captured within the boundaries of the park were added to the collection.

Deposited.—Mr. E. S. Joseph, of Sydney, New South Wales, deposited with the park in September, 1917, a specimen of the brown hyena (*Hyæna brunnea*) of South Africa. The species is one of the rarest of mammals and had not heretofore been exhibited in Washington. It is now possible for the first time to compare in the collection living examples of the three distinct types of hyenas—the spotted, striped, and brown. Birds received on deposit and not otherwise represented in the collection are the Panama parrot (*Amazona farinosa inornata*) from Mrs. M. W. Gill, Washington, D. C., and the blue-winged parrotlet (*Psittacula passerina*) from Mr. W. J. La Varre, jr., Washington, D. C. Fur-bearing animals from the Biological Survey and eight alligators from the Pan-American Union were received on deposit during the year.

REMOVALS.

The following surplus animals were exchanged to other zoological gardens: Five aoudads, 1 tahr, 2 bison, 2 llamas, 2 guanacos, 1 Arabian camel, 5 red deer, 6 fallow deer, 2 Japanese deer, 2 axis deer, 1 Kashmir deer, 4 baboons, 1 monkey, 1 tiger, 1 raccoon, 13 coypus, 6 East Indian black ducks, 4 Canada geese, 3 peafowl, and 6 alligators. A few specimens on deposit were returned to owners.

Among the specimens lost by death were a few of the oldest exhibits in the park—animals that had been here for many years. The female Steller's sea-lion died of gastroenteritis on January 22. This fine specimen was received October 23, 1900, and had therefore been in the park, in good health, for over 17 years. Its age at the time of arrival was uncertain, but it was probably over 2 years old. The Somaliland lioness, Duchess, which was received at the park December 17, 1902, when about 3 years old, from Hon. E. S. Cunningham, United States consul at Aden, died June 15, 1918, at an age of about 19 years, 15½ years of which had been spent in the park. It is extremely doubtful if a wild lion ever reaches so advanced an age. A male Brazilian tapir received from Commander C. C. Todd, United States Navy, May 19, 1899, died September 17, 1917, after a period of 18 years and 4 months of life in the park. Among the birds, a yellow-throated caracara (*Ibycter ater*) received from Hon. E. H. Plumacher, United States consul at Maracaibo, Venezuela, October 19, 1904, after 13 years and 4 months of life in the bird house, died on February 22, 1918. A male cassowary died October 21, 1917, of aspergillosis; it had been in the collection, in excellent health, for eight years. Others of the more serious losses were a wombat, a Japanese bear, the sable antelope, an eland, and a Cape Barren goose.

Through cooperation with the Department of Agriculture, postmortem examinations were made, as usual, by the pathological division of the Bureau of Animal Industry.[1]

Of the animals lost by death, all specimens of scientific importance or needed for museum work, 19 mammals, 20 birds, and 16 reptiles, were transferred to the United States National Museum for study and permanent preservation.

ANIMALS IN THE COLLECTION JUNE 30, 1918.

MAMMALS.

MARSUPIALIA.

Virginia opossum (*Didelphis virginiana*)	6
Tasmanian devil (*Sarcophilus harrisi*)	2
Phalanger (*Trichosurus vulpecula*)	3
Dusky phalanger (*Trichosurus fuliginosus*)	4
Brush-tailed rock kangaroo (*Petrogale penicillata*)	8
Great gray kangaroo (*Macropus giganteus*)	2
Red kangaroo (*Macropus rufus*)	8

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[1] The following list shows the results of autopsies, the cases being arranged by groups:

CAUSES OF DEATH.

Mammals.—Marsupialia: Pneumonia, 2; gastroenteritis, 1; peritonitis, 1. Carnivora: Pneumonia, 4; tuberculosis, 1; gastroenteritis, 2; enteritis, 1; septicemia, 1; cystic chondroma on head, 1. Pinnipedia: Gastroenteritis, 2. Rodentia: Pneumoenteritis, 1. Primates: Pneumonia, 1; tuberculosis, 1; gastroenteritis, 4; severe constipation, 1. Artiodactyla: Pneumonia, 3; tuberculosis, 2; gastroenteritis, 2; pyaemia, 1. Perissodactyla: Tuberculosis, 1.

Birds.—Ratitæ: Aspergillosis, 1. Ciconiiformes: Digestive disorder, 1; enteritis, 1; impaction of crop, 1. Anseriformes: Tuberculosis, 3; aspergillosis, 3; enteritis, 8; catarrhal gastritis, 1; pericarditis, 1; avian gout, 1; anemia, 2; internal hemorrhage, 1; no cause found, 4. Falconiformes: No cause found, 1. Galliformes: Tuberculosis, 2; enteritis, 3; coccidial enteritis, 1; peritonitis, 1; no cause found, 4. Gruiformes: Exposure, 1; no cause found, 3. Charadriiformes: Enteritis, 5; ulcerative enteritis, 4; caseous tumor in peritoneal cavity, 1; no cause found, 1. Cuculiformes: Enteritis, 1; no cause found, 2. Coraciiformes: Hepatic hematoma, 1; septicemia, 4. Passeriformes: Enteritis, 1; inflammation of mucosa of duodenum, 1; anemia, 1; no cause found, 5.

Reptiles.—Serpentes: Parasitism, 1.

Kangaroo Island kangaroo (*Macropus melanops*)	2
Wallaroo (*Macropus robustus*)	8
Black-tailed wallaby (*Macropus ualabatus*)	1
Rufous-bellied wallaby (*Macropus billardierii*)	8
Parma wallaby (*Macropus parma*)	1
Nail-tailed wallaby (*Onychogale frenata*)	1
Wombat (*Phascolomys mitchelli*)	1

CARNIVORA.

Kadiak bear (*Ursus middendorffi*)	1
Alaska Peninsula bear (*Ursus gyas*)	2
Yakutat bear (*Ursus dalli*)	1
Kidder's bear (*Ursus kidderi*)	2
European bear (*Ursus arctos*)	4
Grizzly bear (*Ursus horribilis*)	8
Himalayan bear (*Ursus thibetanus*)	1
Black bear (*Ursus americanus*)	8
Kenai black bear (*Ursus americanus perniger*)	1
Cinnamon bear (*Ursus americanus cinnamomum*)	2
Glacier bear (*Ursus emmonsii*)	1
Sloth bear (*Melursus ursinus*)	1
Polar bear (*Thalarctos maritimus*)	2
Dingo (*Canis dingo*)	1
Eskimo dog (*Canis familiaris*)	2
Gray wolf (*Canis nubilus*)	10
Southern wolf (*Canis floridanus*)	1
Woodhouse's wolf (*Canis frustror*)	2
Coyote (*Canis latrans*)	8
Red fox (*Vulpes fulva*)	5
Gray fox (*Urocyon cinereoargenteus*)	1
Raccoon (*Procyon lotor*)	15
Gray coatimundi (*Nasua narica*)	1
Kinkajou (*Potos flavus*)	1
Ferret (*Mustela furo*)	1
Tayra (*Tayra barbara*)	1
Skunk (*Mephitis nigra*)	1
American badger (*Taxidea taxus*)	2
European badger (*Meles meles*)	2
Florida otter (*Lutra canadensis vaga*)	4
African civet (*Viverra civetta*)	1
Genet (*Genetta genetta*)	1
Spotted hyena (*Crocuta crocuta*)	1
Brown hyena (*Hyæna brunnea*)	1
Striped hyena (*Hyæna hyæna*)	2
African cheetah (*Acinonyx jubatus*)	2
Lion (*Felis leo*)	4
Bengal tiger (*Felis tigris*)	1
Manchurian tiger (*Felis tigris longipilis*)	2
Leopard (*Felis pardus*)	2
East African leopard (*Felis pardus suahelica*)	1
Jaguar (*Felis onca*)	1
Mexican puma (*Felis azteca*)	2
Mountain lion (*Felis hippolestes*)	3
Canada lynx (*Lynx canadensis*)	3
Bay lynx (*Lynx ruffus*)	6
California lynx (*Lynx californicus*)	1

PINNIPEDIA.

California sea-lion (*Zalophus californianus*)	2
Harbor seal (*Phoca vitulina*)	1

RODENTIA.

Patagonian cavy (*Dolichotis patagonica*)	2
Peruvian guinea pig (*Cavia tschudii pallidior*)	5
Guinea pig (*Cavia porcellus*)	20
Coypu (*Myocastor coypus*)	2
Mexican agouti (*Dasyprocta mexicana*)	1
Azara's agouti (*Dasyprocta azaræ*)	2
Crested agouti (*Dasyprocta cristata*)	3
Paca (*Cuniculus paca*)	3
Viscacha (*Lagostomus maximus*)	1
Crested porcupine (*Hystrix cristata*)	1
Woodchuck (*Marmota monax*)	1
Dusky marmot (*Marmota flaviventris obscura*)	1
Prairie-dog (*Cynomys ludovicianus*)	14
Albino squirrel (*Sciurus carolinensis*)	2
American beaver (*Castor canadensis*)	2

LAGOMORPHA.

Domestic rabbit (*Oryctolagus cuniculus*)	15

EDENTATA.

Hairy armadillo (*Euphractus villosus*)	1

PRIMATES.

Black lemur (*Lemur macaco*)	1
White-throated capuchin (*Cebus capucinus*)	2
Margarita capuchin (*Cebus margaritæ*)	1
Chacma (*Papio porcarius*)	1
Hamadryas baboon (*Papio hamadryas*)	2
Mandrill (*Papio sphinx*)	1
Drill (*Papio leucophæus*)	1
Moor macaque (*Cynopithecus maurus*)	1
Brown macaque (*Macaca speciosa*)	2
Japanese monkey (*Macaca fuscata*)	2
Pig-tailed monkey (*Macaca nemestrina*)	2
Rhesus monkey (*Macaca rhesus*)	20
Bonnet monkey (*Macaca sinica*)	1
Javan macaque (*Macaca mordax*)	1
Philippine macaque (*Macaca syrichta*)	1
Sooty mangabey (*Cercocebus fuliginosus*)	2

guenen (*Lasiopyga callitri-*)	1
guenon (*Lasiopyga pygery-*)	2
Lasiopyga mona)	8
y guenon (*Lasiopyga rolo-*	1
ıonkey (*Erythrocebus patas*)	8
nzee (*Pan troglodytes*)	1

ARTIODACTYLA.

l peccary (*Pecari angulatus*)	1
oar (*Sus scrofa*)	1
og (*Phacochærus æthiopicus*)	2
otamus (*Hippopotamus am-* *us*)	8
n camel (*Camelus bactrian-*	2
ı camel (*Camelus dromedari-*	2
o (*Lama huanachus*)	5
(*Lama glama*)	9
(*Lama pacos*)	2
(*Lama vicugna*)	1
deer (*Dama dama*)	2
er (*Axis axis*)	6
er (*Hyelaphus porcinus*)	7
(*Rusa unicolor*)	2
deer (*Rusa philippinus*)	1
ıgha (*Rucervus duvaucelii*)	12
se deer (*Sika nippon*)	10
er (*Cervus elaphus*)	16
ir deer (*Cervus hanglu*)	4
d deer (*Cervus xanthopygus*)	5
an elk (*Cervus canadensis*)	7
a deer (*Odocoileus virginian-*	11
eer (*Odocoileus hemionus*)	4
ailed deer (*Odocoileus colum-* *is*)	4

Blesbok (*Damaliscus albifrons*)	1
White-tailed gnu (*Connochaetes gnu*)	1
efassa water-buck (*Kobus defassa*)	1
Indian antelope (*Antilope cervicapra*)	6
Nilgai (*Boselaphus tragocamelus*)	4
Congo harnessed antelope (*Tragelaphus gratus*)	2
East African eland (*Taurotragus oryx livingstonii*)	2
Tahr (*Hemitragus jemlahicus*)	8
Aoudad (*Ammotragus lervia*)	4
Rocky Mountain sheep (*Ovis canadensis*)	6
Arizona mountain sheep (*Ovis canadensis gaillardi*)	1
Barbados sheep (*Ovis aries*)	7
Zebu (*Bos indicus*)	1
Anoa (*Anoa depressicornis*)	1
Yak (*Poĕphagus grunniens*)	5
American bison (*Bison bison*)	18

PERISSODACTYLA.

Brazilian tapir (*Tapirus terrestris*)	8
Mongolian horse (*Equus przewalskii*)	1
Grant's zebra (*Equus burchelli granti*)	1
Grevy's zebra (*Equus grevyi*)	2
Zebra-horse hybrid (*Equus grevyi-caballus*)	1
Zebra-ass hybrid (*Equus grevyi-asinus*)	1

PROBOSCIDEA.

Abyssinian elephant (*Loxodonta africana oxyotis*)	1

BIRDS.

RATITÆ.

African ostrich (*Struthio aus-* *s*)	4
land ostrich (*Struthio molyb-* *anes*)	1
Rhea americana)	2
Dromiceius novæhollandiæ)	2

CICONIFORMES.

an white pelican (*Pelecanus* *rorhynchos*)	9
an white pelican (*Pelecanus* *rotalus*)	2
e pelican (*Pelecanus roseus*)	2
lian pelican (*Pelecanus con-* *llatus*)	2
pelican (*Pelecanus occiden-*)	8
cormorant (*Phalacrocorax* *us floridanus*)	18
blue heron (*Ardea herodias*)	1
egret (*Egretta candidissima*)	2
rowned night heron (*Nycti-* *nycticorax nævius*)	20

Boatbill (*Cochlearius cochlearius*)	2
White stork (*Ciconia ciconia*)	8
Black stork (*Ciconia nigra*)	1
Straw-necked ibis (*Carphibis spinicollis*)	2
Sacred ibis (*Threskiornis æthiopicus*)	8
White ibis (*Guara alba*)	11
Scarlet ibis (*Guara rubra*)	2
Roseate spoonbill (*Ajaia ajaja*)	2
European flamingo (*Phænicopterus roseus*)	1

ANSERIFORMES.

Black-necked screamer (*Chauna torquata*)	1
Mallard (*Anas platyrhynchos*)	17
East Indian black duck (*Anas platyrhynchos* var)	4
Black duck (*Anas rubripes*)	8
Gadwall (*Chaulelasmus streperus*)	2
Baldpate (*Mareca americana*)	7
Green-winged teal (*Nettion carolinense*)	9

Blue-winged teal (*Querquedula discors*)	7
Cinnamon teal (*Querquedula cyanoptera*)	1
Ruddy sheldrake (*Casarca ferruginea*)	1
Pintail (*Dafila acuta*)	8
Wood duck (*Aix sponsa*)	18
Mandarin duck (*Dendronessa galericulata*)	28
Canvasback (*Marila valisineria*)	2
Redhead (*Marila americana*)	7
Lesser scaup duck (*Marila affinis*)	6
Ring-necked duck (*Marila collaris*)	1
Rosy-billed pochard (*Metopiana peposaca*)	1
Snow goose (*Chen hyperboreus*)	3
Greater snow goose (*Chen hyperboreus nivalis*)	2
Blue goose (*Chen cærulescens*)	6
Ross's goose (*Chen rossii*)	1
White-fronted goose (*Anser albifrons*)	4
American white-fronted goose (*Anser albifrons gambeli*)	1
Toulouse goose (*Anser cinereus domesticus*)	2
Bar-headed goose (*Anser indicus*)	2
Canada goose (*Branta canadensis*)	18
Hutchins's goose (*Branta canadensis hutchinsii*)	3
Cackling goose (*Branta canadensis minima*)	2
Brant (*Branta bernicla glaucogastra*)	6
Barnacle goose (*Branta leucopsis*)	4
Upland goose (*Chloëphaga leucoptera*)	1
Spur-winged goose (*Plectropterus gambensis*)	1
Cape Barren goose (*Cereopsis novæhollandiæ*)	1
Wandering tree duck (*Dendrocygna arcuata*)	2
White-faced tree duck (*Dendrocygna viduata*)	3
Mute swan (*Cygnus gibbus*)	4
Whistling swan (*Olor columbianus*)	3
Trumpeter swan (*Olor buccinator*)	2
Black swan (*Chenopis atrata*)	3

FALCONIFORMES.

South American condor (*Vultur gryphus*)	1
California condor (*Gymnogyps californianus*)	3
Turkey vulture (*Cathartes aura*)	4
Black vulture (*Coragyps urubu*)	2
King vulture (*Sarcoramphus papa*)	2
Secretary bird (*Sagittarius sepentarius*)	1
Griffon vulture (*Gyps fulvus*)	2
Cinereous vulture (*Aegypius monachus*)	2
Caracara (*Polyborus cheriway*)	3
Crowned hawk eagle (*Spizaëtus coronatus*)	1
Wedge-tailed eagle (*Uroaëtus audax*)	2
Golden eagle (*Aquila chrysaëtos*)	2
Bald eagle (*Haliæetus leucocephalus*)	15
Alaskan bald eagle (*Haliæetus leucocephalus alascanus*)	1
Sparrow hawk (*Falco sparverius*)	2
Ferruginous rough-leg (*Archibuteo ferrugineus*)	1
Red-tailed hawk (*Buteo borealis*)	1
Swainson's hawk (*Buteo swainsoni*)	1

GALLIFORMES.

Mexican curassow (*Crax globicera*)	2
Daubenton's curassow (*Crax daubentoni*)	1
Domestic turkey (*Meleagris gallopavo*)	2
Wild turkey (*Meleagris gallopavo silvestris*)	2
Peafowl (*Pavo cristatus*)	30
Peacock pheasant (*Polyplectron bicalcaratum*)	1
Silver pheasant (*Gennæus nycthemerus*)	1
Lady Amherst's pheasant (*Chrysolophus amherstiæ*)	1
Golden pheasant (*Chrysolophus pictus*)	4
Bobwhite (*Colinus virginianus*)	2
Scaled quail (*Callipepla squamata*)	6
Gambel's quail (*Lophortyx gambelii*)	5
Valley quail (*Lophortyx californica vallicola*)	1

GRUIFORMES.

American coot (*Fulica americana*)	15
South Island weka rail (*Ocydromus australis*)	3
Short-winged weka (*Ocydromus brachypterus*)	2
Earl's weka (*Ocydromus earli*)	1
Whooping crane (*Grus americana*)	1
Sandhill crane (*Grus mexicana*)	3
White-necked crane (*Grus leucauchen*)	1
Indian white crane (*Grus leucogeranus*)	1
Lilford's crane (*Grus lilfordi*)	3
Australian crane (*Grus rubicunda*)	1
Demoiselle crane (*Anthropoides virgo*)	7
Crowned crane (*Balearica pavonina*)	2
Cariama (*Cariama cristata*)	1

CHARADRIIFORMES.

Great black-backed gull (*Larus marinus*)	1
Herring gull (*Larus argentatus*)	1
Laughing gull (*Larus atricilla*)	2
Australian crested pigeon (*Ocyphaps lophotes*)	5
Wonga-wonga pigeon (*Leucosarcia picata*)	10

pigeon (*Columba phæo-*	
	1
on (*Columba leuconota*)	2
wned pigeon (*Patagiœnas*	
hala)	1
d pigeon (*Chlorœnas fas-*	
	4
pigeon (*Chlorœnas flavi-*	
	3
ged dove (*Melopelia asi-*	
	1
dove (*Zenaidura macro-*	
	5
e (*Geopelia striata*)	13
ked dove (*Oena capensis*)	1
(*Scardafella inca*)	3
d quail-dove (*Starnœnas*	
hala)	1
rtle-dove (*Streptopelia ri-*	
	12

CUCULIFORMES.

ted touraco (*Turacus co-*	
)	1
oquet (*Melopsittacus un-*	
)	2
d paroquet (*Polytelis*	
a)	1
aroquet (*Palæornis fasci-*	
	1
sa parrot (*Coracopsis ni-*	
	1
ot (*Psittacus erithacus*)	2
aroquet (*Aratinga chlo-*	
	1
d parrotlet (*Psittacula*	
a)	1
arrot (*Amazona leuco-*	
)	3
uldered parrot (*Amazona*	
sis)	1
rrot (*Amazona festiva*)	1
ted parrot (*Amazona al-*	
	1
ged parrot (*Amazona*	
ca)	1
mingo parrot (*Amazona*	
s)	2
ded parrot (*Amazona och-*	
la)	5
ed parrot (*Amazona au-*	
a)	2
llow-head parrot (*Ama-*	
trix)	7
eked parrot (*Amazona au-*	
)	1
ed parrot (*Amazona fari-*	
rnata)	1
arrot (*Myiopsitta mo-*	
	1
parrot (*Rhynchopsitta*	
ncha)	2
macaw (*Ara severa*)	1
e macaw (*Ara chlorop-*	
	2
e-and-yellow macaw (*Ara*	
	7
llow macaw (*Ara ara-*	
	1

Sulphur-crested cockatoo (*Cacatoes galerita*)	2
Great red-crested cockatoo (*Cacatoes moluccensis*)	1
White cockatoo (*Cacatoes alba*)	3
Leadbeater's cockatoo (*Cacatoes leadbeateri*)	1
Bare-eyed cockatoo (*Cacatoes gymnopsis*)	3
Roseate cockatoo (*Cacatoes roseicapilla*)	12
Kea (*Nestor notabilis*)	6

CORACIIFORMES.

Giant kingfisher (*Dacelo gigas*)	2
Concave-casqued hornbill (*Dichoceros bicornis*)	1
Barred owl (*Strix varia*)	6
Screech owl (*Otus asio*)	3
Great horned owl (*Bubo virginianus*)	2
Western horned owl (*Bubo virginianus pallescens*)	1

PASSERIFORMES.

Red-billed hill-tit (*Liothrix luteus*)	7
Australian gray jumper (*Struthidea cinerea*)	1
Green jay (*Xanthoura luxuosa*)	7
Australian crow (*Corvus coronoides*)	1
European raven (*Corvus corax*)	1
Malabar starling (*Spodiopsar malabaricus*)	1
Napolean weaver (*Pyromelana afra*)	2
Crimson-crowned weaver (*Pyromelana flammiceps*)	1
Madagascar weaver (*Foudia madagascariensis*)	4
Paradise weaver (*Steganura paradisea*)	2
Cut-throat finch (*Amadina fasciata*)	1
Zebra finch (*Tæniopygia castanotis*)	7
Black-faced Gouldian finch (*Poëphila gouldiæ*)	6
Red-faced Gouldian finch (*Poëphila mirabilis*)	3
Strawberry finch (*Amandava amandava*)	12
Black-headed finch (*Munia atricapilla*)	4
Nutmeg finch (*Munia punctularia*)	13
Java finch (*Munia oryzivora*)	11
White Java finch (*Munia oryzivora*)	4
Vera Cruz red-wing (*Agelaius phœniceus richmondi*)	2
Song sparrow (*Melospiza melodia*)	3
Tree sparrow (*Spizella monticola*)	1
White-throated sparrow (*Zonotrichia albicollis*)	1
Saffron finch (*Sicalis flaveola*)	9
Canary (*Serinus canarius*)	3
Green singing finch (*Serinus icterus*)	2
European chaffinch (*Fringilla cœlebs*)	4
Red-crested cardinal (*Paroaria cucullata*)	2
Cardinal (*Cardinalis cardinalis*)	1

REPTILES.

Crocodile (*Crocodylus acutus*)	1
Alligator (*Alligator mississipiensis*)	81
Mona Island iguana (*Cyclura stejnegeri*)	1
Gila monster (*Heloderma suspectum*)	6
Blue-tongued lizard (*Tiliqua scincoides*)	1
Rock python (*Python molurus*)	8
Diamond python (*Python spilotes*)	1
Anaconda (*Eunectes murinus*)	2
Boa constrictor (*Constrictor constrictor*)	4
Water snake (*Natrix sipedon*)	2
Coach-whip snake (*Coluber flagellum*)	1
Chicken snake (*Elaphe quadrivittata*)	2
Slug-eating snake (*Petalognathus nebulatus*)	1
Duncan Island tortoise (*Testudo ephippium*)	1
Albermarle Island tortoise (*Testudo vicina*)	1

STATEMENT OF THE COLLECTION.

ACCESSIONS DURING THE YEAR.

Presented:		
Mammals	14	
Birds	50	
Reptiles	39	
		103
Born and hatched in the National Zoological Park:		
Mammals	63	
Birds	45	
		108
Received in exchange:		
Mammals	11	
Birds	25	
Reptiles	6	
		42
Purchased:		
Mammals	13	
Birds	104	
Reptiles	1	
		118
Transferred from other Government departments:		
Mammals	8	
Birds	2	
		10
Captured in National Zoological Park:		
Mammals	3	
Birds	5	
Reptiles	1	
		9
Deposited:		
Mammals	3	
Birds	6	
Reptiles	9	
		18
Total accessions		408

SUMMARY.

Animals on hand July 1, 1917	1,223
Accessions during the year	408
	1,631
Deduct loss (by exchange, death, and return of animals on deposit)	384
Animals on hand June 30, 1918	1,247

Class.	Species.	Individuals.
Mammals	149	483
Birds	190	706
Reptiles	15	58
Total	354	1,247

VISITORS.

All records for the numbers of visitors to the park have been exceeded during the past year. The total number of people admitted to the grounds, as determined by count and estimate, was 1,593,227, a daily average of 4,365. The greatest number in any one month was 202,793 in March, 1918, an average per day of 6,542. The attendance by months was as follows:

In 1917: July, 76,100; August, 157,700; September, 195,350; October, 175,350; November, 158,600; December, 70,350. In 1918: January, 35,850; February, 56,300; March, 202,793; April, 139,934; May, 187,300; June, 137,600.

These numbers exceed the attendance records for last year by 486,427, and are 436,117 over the attendance for 1916—the record year up to that time. Heretofore there has usually been a falling off in the number of visitors during the heat of summer; but, with the population of Washington so increased by war workers, the attendance throughout the past heated season has hardly diminished from that of spring and autumn.

The great increase in the number of visitors to the park in the past three years is graphically shown in the following statement of attendance records for the last 10 years:

1909	564, 689
1910	721, 555
1911	521, 440
1912	542, 788
1913	633, 526
1914	733, 277
1915	794, 530
1916	1, 157, 110
1917	1, 106, 800
1918	1, 593, 227

Seventy-eight schools and classes visited the park in 1918, with a total of 4,945 individuals.

IMPROVEMENTS.

Owing to a lack of sufficient funds for any substantial improvements, only minor repairs or additions were made during the year to the buildings and equipment of the park. New boiler tubes and some other fittings in the central heating plant were provided at a cost of about $800. The restaurant building was repaired, the kitchen enlarged, and new counters provided. The old slippery and badly worn pavement was removed from the large elephant house and was replaced with a floor of concrete. The old and smaller elephant house was fitted up for winter quarters for certain of the waterfowl. Much-needed repairs were made to the lion-house roof, the western half of the north extension and the adjoining portion of the main roof were covered with new paroid-felt roofing, and a ventilator was placed in the main building over the public space. Minor repairs were also made to the bird house, the antelope house, and the Henderson outdoor parrot cage.

A large concrete bathing pool was constructed in the yak's inclosure and the tanks in the bear yards were all repaired. The fences of the bear yards, antelope yards, and some others of the outdoor cages and inclosures were painted. An outdoor cage 16 feet square, with shelter attached, was constructed for the kea parrots received as a gift from the New Zealand Government. The indoor chimpanzee quarters, in the lion house, were reconstructed with gratings of three-fourths inch iron pipe, which provide a much better hold for the animal's hands and feet than did the old three-eighths inch bars. Concrete walls and bases for shelter houses were built at some of the deer paddocks, the cinder footpaths were extensively repaired, and a concrete walk and stairway was built leading up the west hillside from the suspension bridge and connecting with the walk around the eland yards. Part of the stable building near the office was rebuilt for a chicken house and, in a further effort to lessen the cost of food for animals, the garden acreage was again materially increased.

THE FLORA OF THE PARK.

In addition to an extensive native flora, the park contains many exotic trees and shrubs. It is important that records be kept of all introductions. During the past year Mr. William Hunter, gardener, who has been in the service since the inception of the park, has prepared an annotated list of all the trees and shrubs found growing within the boundary fence. The list has been copied on cards for filing, and will be carefully edited and revised during the present season. Information is given as to the abundance and location of native species and, in the case of exotics, the source, date of introduction, location, or any additional information likely to be needed for future reference. Efforts will be made to secure specimens of trees properly belonging to the flora of the District of Columbia and not represented in the park, in order that all the native species may be found within this reserve. A similar list of herbaceous plants, prepared several years ago, will be brought up to date, thus furnishing a complete catalogue of the flora of the park, which, it is to be hoped, may later be published in some form as part of a guide to the natural features of the park. Lists of the native mammals, birds, and reptiles of the park, with pertinent data, are also in preparation for some similar purpose.

ALTERATION OF THE WESTERN BOUNDARY.

By an act approved June 23, 1913, Congress appropriated $107,200 for the purchase of certain lots and parcels of land between the western boundary of the National Zoological Park and Connecticut Avenue, from Cathedral Avenue to Klingle Road, this land, together with the included highways, to become a part of the park. The appropriation was not a continuing one and lapsed at the end of one year, before legal proceedings for the purchase were completed. Items for the reappropriation of this sum and for the additional amount necessary to meet the figures fixed by the court in proceedings of condemnation have since been submitted to Congress in the estimates each year, but have not been favorably considered.

The principal entrance to the park will always be from Connecticut Avenue, and the importance of a frontage on that thoroughfare at and bordering the gate can not be overestimated. The necessary land should be acquired before it is too late, in order that when the time comes a dignified entrance gate can be constructed and the near-by land controlled by the park authorities.

IMPORTANT NEEDS.

Roads, bridle paths, and automobile parking.—As mentioned in the report for last year, the question of providing space for the parking of automobiles near the main buildings is serious. The enormous increase in the number of cars visiting the park makes it difficult to care for the safety of the public without adequate parking space. More than 4,500 automobiles sometimes pass through the park in a single day, and many of the large sight-seeing cars regularly visit the Zoo. During the coming year it will be necessary to make extensive repairs to roads and walks, and some change should be made in the bridle path in order that riders would not be forced to use the bridge and main road from the Harvard Street gate to the crossroads.

Grading and filling.—As soon as practicable the work of grading and filling, commenced two years ago but discontinued for lack of funds, should be completed. As left, it makes an unsightly and unfinished-looking place in one of the most conspicuous points in the park bordering the main road. The further cutting away of the irregular hill in the center of the western part of the park and the filling in of the near-by ravine will level nearly 70,000 square feet of ground which is now of little use and make available a further 25,000 square feet of ground at the ravine. This will eliminate a dangerous curve in the automobile road.

Repairs to antelope house.—Practically the whole west side of the antelope house needs reconstruction. The building is over 20 years old and the timbers and other woodwork on the west side are almost beyond repair. When the work is undertaken the walls should be fixed properly with concrete and the cages considerably enlarged.

It is estimated that an expenditure of about $2,000 will be necessary to put this building in good condition.

Adams Mill Road grade and stairway.—The work of grading Adams Mill Road between Clydesdale Place and Harvard Street, recently commenced by the District, will make necessary some expenditure on the part of the park to care for the resulting fill above the stairway and walk leading into the park from the Adams Mill Road gates. At present it is impossible to estimate the exact amount of work that will be needed, but it is probable that a new bridge and walk will have to be built at one point, with a substantial retaining wall at the base of the fill for the safety of the public. A very narrow strip of land between Adams Mill Road and the park, from Clydesdale Place to Ontario Road, still in private ownership, should be added to the park for the protection of this point.

Additional lake for waterfowl.—Exhibits of waterfowl are among the most popular and instructive features of the park. An additional lake, to be used for the birds in summer and for skating in winter, could be built at comparatively small expense on the open flat near the Harvard Street entrance.

Aviary building.—The need of a new house for the exhibition of birds has been felt for some years and is becoming more pressing because of the greatly increased numbers of visitors now cared for in the park. Such a building should be provided with commodious public space. The aisles in the old bird house are far too narrow for the crowds of the present day, and the exhibition of birds, important and valuable as it is, can not be properly displayed.

Reptile house.—A public exhibition building, properly constructed and equipped for the display of reptiles and amphibians, would be greatly appreciated by visitors. The small collection of reptiles now kept in inadequate and wholly unsuited quarters in the lion house is very popular. The reptile house should be planned to show in natural environment the various types of reptiles of economic importance, those sought and used for food, and those feared by man in many countries. The educational value of such a building could be developed to a point of great importance.

Outdoor quarters for mammals.—Many species of mammals, especially some of the larger carnivores, now kept in cages in heated buildings, could be much better shown and more pleasantly and healthfully located in outdoor quarters with warm but unheated shelters. A large African lion, kept in the park for two winters without artificial heat, has shown marked improvement from such treatment. Such provision should be made for the exhibition of certain of the lions, the Siberian tigers, and other mammals. Outdoor cages, adjoining the winter quarters, should be constructed on the east side of the lion house for the leopards, jaguars, and hyenas.

The unsightly row of cages along the crest of the hill north of the bird house should be replaced by new sanitary yards with comfortable but unheated retiring quarters attached.

Owing to the great increase in the number of people who take advantage of the recreational and educational features of the park, the necessity for a substantial increase in the appropriation for regular maintenance expenses is apparent. For the safety and comfort of the public the number of policemen, attendants, keepers, and caretakers must be augmented, as the force now maintained is not greater than was considered necessary when the attendance was barely half its present figures.

Respectfully submitted.

N. Hollister, *Superintendent.*

Dr. Charles D. Walcott,
Secretary Smithsonian Institution,
Washington, D. C.

APPENDIX 5.

REPORT ON THE ASTROPHYSICAL OBSERVATORY.

SIR: The Astrophysical Observatory was conducted under the following passage of the sundry civil act approved June 12, 1917:

> Astrophysical Observatory: For maintenance of Astrophysical Observatory, under the direction of the Smithsonian Institution, including assistants, purchase of necessary books and periodicals, apparatus, making necessary observations in high altitudes, repairs and alterations of buildings, and miscellaneous expenses, $13,000.
>
> For observation of the total eclipse of the sun of June eighth, nineteen hundred and eighteen, including purchase of necessary apparatus and supplies, transportation of equipment to and from observing station, hire of temporary assistance, transportation and subsistence of observers, and miscellaneous expenses, $2,000.

The observatory occupies a number of frame structures within an inclosure of about 16,000 square feet south of the Smithsonian Administration Building at Washington, and also a cement observing station and frame cottage for observers on a plot of 10,000 square feet, leased from the Carnegie Solar Observatory on Mount Wilson, Cal.

Its equipment comprises special optical, electrical, and other apparatus adapted to measure radiation of the sun, the sky, and terrestrial sources. Much of the apparatus has been built at the observatory instrument shop on the Smithsonian grounds in Washington according to designs of the director. The instrument maker, Mr. A. Kramer, has been employed by the observatory nearly 30 years in this experimental construction work, and his experience and skill, added to his natural ability, render him invaluable. New designs are continually being worked out as new experiments are being made.

The present value of the buildings and equipment is estimated at $50,000. This estimate contemplates the cost required to replace the outfit for the purposes of the investigations. Owing to the highly specialized character of the apparatus no such value could be obtained at public sale.

WORK OF THE YEAR.

At Washington.—As heretofore the work of measuring and computing from the records obtained in the field on Mount Wilson has gone on steadily in charge of Mr. F. E. Fowle, aided by Miss F. A. Graves, computer, and Mr. R. Eisinger, messenger.

Mr. Fowle completed and published[1] his investigation of the absorption of long wave rays by long columns of air containing known quantities of water-vapor. His results give the relations between absorption and atmospheric humidity, wave-length by wave-length, from the visible spectrum down to waves of more than 20 times the maximum visible wave-length, and for quantities of water ranging from $\frac{1}{200}$ to three times that which prevails in the vertical thickness of the atmosphere above Washington in clear spring weather. Many difficulties which were met required tedious subsidiary investigations which are described in the paper.

Notwithstanding the greatness of this contribution to meteorological science the subject of the relations of water-vapor and terrestrial radiation demands yet more investigation adapted to cover the range of wave-lengths from 16 microns to 50 microns, where Mr. Fowle was forced to give over the investigation temporarily, because no substance suitable to make a prism for forming the spectrum of these rays was known.

Mr. Aldrich has since investigated at the observatory a great number of natural crystalline and other substances, including many pure chemical preparations. None was found appreciably more transparent than rock salt, which was used by Mr. Fowle, except potassium iodide. Apparently this substance, if it could be procured in large crystals, or fused into a noncrystalline structure, would be suitable to carry the work to much longer wave-lengths. Efforts have been made, as yet unsuccessfully, to procure blocks of this substance of suitable proportions and inner structure for making large prisms.

Mr. Aldrich has carried on a number of investigations on the absorption and reflection of atmospheric-water-vapor, liquid water, lampblack, gelatin, and other substances to rays emitted by a blackened reservoir filled with boiling water. In these experiments he has employed rock salt transmission plates to roughly separate the total radiation into two parts, whose wave-lengths are respectively greater and less than about 20 microns, where rock salt ceases to be transparent. The results on water-vapor agree well with what Mr. Fowle's spectrum work would tend to indicate. They also show that an atmospheric layer about 50 meters deep, containing water-vapor equal to 0.05 centimeters of precipitable water, would probably absorb all the rays sent out by the 100° C. radiator which are nontransmissible to rock salt, that is above the wave-length 20 microns. This is in harmony with observations of the sun and of nocturnal radiation made by Mr. Aldrich on Mount Wilson, to which reference will be made below. The results on liquid water show it to be completely opaque in layers of 1 centimeter or more thickness to all rays of the above described 100° C. radiation. The reflecting power of water surfaces to these rays varies with the angle of incidence as follows:

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[1] Water Vapor Transparency to Low-temperature Radiation. Smith. Misc. Coll., Vol. 68, No. 8, 1917.

Incidence	0°	30°	55°	63°	70°	72°
Reflection o/o	2	3	7	10	17	22

From this it follows that though perfectly opaque in layers exceeding 1 cm. thickness, water is not a perfect absorber or a perfect radiator for long-wave rays. It may be regarded as emitting about 90 per cent as much radiation as the perfect radiator at temperatures from 0° to 100° C.

Lampblack paint proved partially transparent and partially reflecting. Further experiments are required before publishing definite results, but evidently those who employ lampblacked surfaces in experiments with long-wave rays should consider these imperfections of radiating and absorbing power.

An investigation was made on possible regularities of periodicity in the short-interval variability of the sun[1] observed at our Mount Wilson station. Dr. H. H. Clayton had made such an investigation for the year 1913 and found indistinct tendencies toward a repetition of solar constant conditions after intervals of 12 and 22 days. Computations were made here to extend the investigation to the other years from 1908 to 1916, excepting 1912.

Well marked relatively hot and cold hemispheres of the sun seem to have prevailed for several months in 1915, giving a "solar constant" periodicity of about 27 days. In 1916 an extraordinary regular periodicity of 3½ days seemed to be indicated. In other years tendencies to periodicities of other intervals were found, and generally more marked than in 1913, but not as prominently seen as in 1915 and 1916. On the whole the irregularity of period of the fluctuations of solar radiation would seem to be the most outstanding result of the inquiry.

In accordance with the wish expressed by Secretary Walcott, the facilities of the observatory have been employed whenever possible to assist in military investigations. This is not the time to detail the results of this effort further than to say that a large part of the work of the director and of Mr. Aldrich has been devoted to several such investigations, and with highly appreciated results. Naturally this has diminished the astrophysical output of the observatory.

Chilean expedition.—Preparations and arrangements for a South American solar-radiation expedition occupied much of the time of the director and that of the instrument maker. As stated in last year's report, a proposed expedition under the auspices of the Hodgkins fund to observe the solar radiation in the most cloudless region of Chile was temporarily postponed on account of the entry of the United States into war, and the expedition was diverted for a time to Hump Mountain in western North Carolina. Observations of the solar constant of radiation were made there, when weather permitted, until March, 1918. By that time it had grown to be certain that the site was too cloudy for the work, and, notwithstanding grave difficulties brought about by the war, the expedition was sent to Chile as originally proposed.

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[1] On Periodicity in Solar Variation. Smith. Misc. Coll., vol. 69, No. 6, 1918.

Director A. F. Moore and Assistant L. H. Abbot landed at Antofagasta, Chile, on June 16, 1918, with a large equipment of apparatus and supplies suitable to the investigation. They were greatly aided by the governor of the Province, the United States consul, and others, and the Chile Exploration Co. generously gave them the use of buildings and other valuable facilities at their disused mine at Chorillos, near Calama. Calama is a station on the railroad east of the nitrate desert, on the bank of the River Loa, at latitude N. 22° 28′, longitude W. 68° 56′, altitude 2,250 meters. Manuscript of daily meteorological records of two years, most kindly copied by Dr. Walter Knoche, former director of the Chilean Meteorological Service, lead us to hope for as many as 300 days per year favorable to solar-constant work there. The experiments are to be continued daily, as far as possible, for several years. They should furnish meteorologists with a firm basis for estimating the effects of the solar variability on the terrestrial climate.

TOTAL SOLAR ECLIPSE.

Owing to the pressure of military investigations our preparations for observing the total solar eclipse of June 8, 1918, were not extensive. The observations proposed were confined to observing the eclipse phenomena visually, photographing the solar corona, and determining the sun and sky radiation during the partial phase, and the "nocturnal" radiation during the total phase by means of the pyranometer.

Necessary apparatus was prepared at the observatory shop. It comprised parts for two 11-foot focus cameras, each of 3 inches aperature with equatorial mounting and driving clockwork, and two pyranometers. The observations were in charge of Mr. L. B. Aldrich, who was assisted by Mr. A. Kramer and by Rev. Clarence Woodman, a volunteer observer who had aided us in 1900.

The station selected was near Lakin, Kans., not because it was the most favorable, but because the more favorable parts of the eclipse track farther west would be occupied, it was known, by many eclipse parties, so that the chances of having clear weather at some station were materially increased by the choice of one so far east as Kansas. Magnetic observers sent out by Dr. Bauer were also at Lakin, and, being already on the ground, aided materially in establishing Mr. Aldrich's party.

The observers chose the site on Monday, June 3, and were hospitably entertained at the home of Mr. Pittenger, a rancher. The cameras were set up in a barn looking out westward through a slot cut away for the purpose. Unfortunately cloudy and rainy weather hindered the preparations and prevented the rating of the clock and the photographic focusing of the lenses on the stars, so that the adjustment could be made but roughly.

On eclipse day, Saturday, June 8, no hope was felt of fair weather during the forenoon, but fortunately the sky became nearly free from clouds about 1 o'clock and continued so until after nightfall and during Sunday. All times of contact were observed by Rev. Fr. Woodman, who also exposed the cameras, as follows:

Latitude	37°	53′	04.2″	N.
Longitude	101	17	51.3	W.
Contacts (Greenwich mean time):				
	H.	*m.*	*s.*	
First	10	19	48.5	
Second	11	27	15.1	
Third	11	28	37.3	
Fourth	12	29	45.4	

The observers regarded the eclipse as unexpectedly dark and the phenomenon as more than usually grand.

Very good photographs of the corona were obtained, showing extensions to about 3 diameters of the sun in some directions. Owing to lack of opportunity to rate the clock there was some evidence of imperfect following. The negatives were developed, with the kind permission and advice of Director E. C. Pickering, by Mr. King at Harvard College Observatory.

Messrs. Aldrich and Kramer observed successfully throughout the afternoons and early night hours of June 8 and June 9 with the pyranometer. The results obtained measure the gradual diminution of the radiation of the sun and of the brightness of the sky as the eclipse progressed, the outgoing radiation from the earth's surface during totality, the gradual increase of sun and sky radiation afterwards, their decline toward sunset, and the outgoing radiation from the earth's surface after nightfall. Numerical values will be published later.

WORK AT MOUNT WILSON.

Mr. L. B. Aldrich occupied the Mount Wilson station until October 11, 1917, and again after June 14, 1918. He continued the usual solar constant determinations and the determinations of the distribu-

n of radiation over the sun's disk. Two improvements were intro-
ed in the apparatus.

The coelostat used in solar constant work was provided with stel-
mirrors in place of silver on glass, so that now the optical train
the spectrobolometer for solar constant work contains exclusively
tarnishable mirrors. This allows us to compare as never before
distribution of radiation in the solar spectrum from day to day.
hope now to determine surely whether the variations of solar
liations are uniform over the whole spectrum or predominate in
tain wave lengths.

A specially designed vacuum bolometer like the one employed at
mp Mountain and in Chile and wholly sealed in glass so as not
r to require attention to renew the vacuum has been substituted.
is bolometer was constructed to exact specifications as to length,
adth, and thickness of strips in accordance with completely
rked-out unpublished theory of the bolometer. We are sure that
is the last word on the subject as regards adaptability to our in-
tigation. All expected results are obtained in its actual use.

The sky was more cloudy than usual on Mount Wilson both in 1917
d 1918, during the time of our expeditions. In the winter, in
vember, December, and January of 1917–18, the Carnegie Institu-
n observers reported unusually good weather for the season.

Mr. Aldrich carried on in 1917 some investigations to determine
ether long-wave rays, not transmissible by rock salt (that is, ex-
ding 20 microns in wave length), occur in the solar beam at the
th's surface. The experiments indicated that they do not. He
o investigated the transmissibility of the atmosphere for rays of
re than 20 microns in wave length by means of the pyranometer
th and without a rock-salt cover. The experiments showed that
n toward the zenith these rays are wholly cut off by the lower
ers of the atmosphere. Hence we may conclude from both the
ar and nocturnal observations that our atmosphere is opaque to
s exceeding 20 microns in wave length, such as are emitted in
ognizable quantities by bodies at terrestrial or solar temperatures.
is result is in harmony with Mr. Aldrich's laboratory experiments
ve mentioned.

In June, 1918, experiments were begun at Mount Wilson to deter-
ne the distribution of solar radiation along that diameter of the
ar image which is at right angles to the east and west diameter
estigated in our usual tower telescope work. A special apparatus
s arranged to slowly rotate the second mirror of the coelostat, and
s produce a regular drift of the solar image along any desired
meter. Preliminary results obtained show that the differences, if
, between the distribution of radiation along different solar di-
eters do not amount to 1 per cent.

PERSONNEL.

R. Eisinger resigned from our service in June, 1918, and after service in the Treasury Department enlisted in the Army.

SUMMARY.

During the year covered by this report, great advance has been made in the study of very long wave-length rays and their transmissibility in our atmosphere. Solar constant work at Mount Wilson has been continued and improved. An expedition under the auspices of the Hodgkins Fund of the Smithsonian Institution, but equipped and directed from the Astrophysical Observatory, has observed the solar constant at Hump Mountain, N. C., and now is located for a term of years in exceptionally favorable circumstances at Calama, Chile. The total solar eclipse of June 8, 1918, was successfully observed. The variability of the sun is shown to have vestiges of periodicity, though predominently irregular. A great deal of attention has been given to war problems.

Respectfully submitted.

C. G. Abbot,
Director Astrophysical Observatory.

Dr. C. D. Walcott,
Secretary Smithsonian Institution.

APPENDIX 6.

REPORT ON THE LIBRARY.

SIR: I have the honor to submit the following report on the activities of the library of the Smithsonian Institution during the fiscal year ended June 30, 1918:

Conditions abroad have curtailed exchanges to a great extent. Notwithstanding, a large number of foreign publications are being received regularly and the sets on file are up to date. Special attention has been given to exchanges with South American countries, with very gratifying results, and the same can be said of the domestic exchanges.

There were received during the year 27,212 packages, an increase of 2,920 over the year preceding. Of these 26,230 were received by mail and 928 through the international exchanges. Correspondence connected therewith amounted to 1,087 letters and 2,725 acknowledgments on the regular printed forms.

SMITHSONIAN LIBRARY.

Main library.—Publications for the Smithsonian Main Library, after entry on the records, are forwarded to the Smithsonian deposit in the Library of Congress. During the fiscal year 2,773 were accessioned, consisting of 2,369 complete volumes, 419 parts of volumes, 954 pamphlets, and 88 charts. The accessions numbers were extended from 527,151 to 529,924.

The cataloguing included 3,331 volumes, 95 charts, and the addition of 1,334 new titles; 1,925 volumes were recatalogued; 1,050 cards were typewritten, and 4,086 printed cards from the Library of Congress, for publications deposited by the Institution, were filed in the catalogue. In accordance with the established policy, the public documents presented to the Smithsonian Institution, numbering 3,442, were transferred to the Library of Congress without stamping or recording.

Dissertations were received from the Universities of Pennsylvania, Johns Hopkins, Königsberg, Toulouse, Lund, and Breslau, and the technical schools of Dresden and Berlin.

The securing of exchanges in return for Smithsonian publications and missing parts to complete sets has been continued. Two hundred and twenty want cards for series in the Smithsonian Division at the

Library of Congress were considered, and 168 volumes and 389 parts of volumes were secured. Ninety-eight wants were completed. Action on the 85 want cards received from the periodical division resulted in the securing of eight volumes and 240 parts of volumes. The order division obtained, in response to 19 cards, 19 volumes and 18 parts of volumes. The total number of wants completed was 142.

Office reference library.—The accessions for the office library, which includes the Astrophysical Observatory and the National Zoological Park, amounted to 555 publications, distributed as follows: Office library, 278 volumes and 164 pamphlets; Astrophysical Observatory. 58 volumes and 49 pamphlets and parts of volumes; National Zoological Park, 91 volumes and 1 pamphlet.

Aeronautical library.—The importance and value of books relating to aeronautics has been manifested through their use by the student who has returned day after day to follow up a subject. There have been added during the year 128 volumes. The bibliography of aeronautics, which I have had in preparation for the National Advisory Committee for Aeronautics, has been completed and, with the close of the year, it is ready for the printer. The appropriation for printing was approved just at the close of the year.

Reading room.—The frequent use of the reading room is especially worthy of note. There were in circulation 3,520 periodicals, an increase of 153 over the year preceding.

During the summer months the use of the library was extended to the soldiers who drill each day on the Mall. Adequate facilities for letter writing were provided, and the room has been filled with soldiers daily during their rest periods.

Employees' library.—The number of volumes circulated in the employees' library has increased to 336. There has been practically no addition to the number of volumes, as the greater portion of the reading wants of employees can be supplied through the reading room and the war library of the Museum.

NATIONAL MUSEUM LIBRARY.

There has been one exceptional and important addition to the library of the United States National Museum, and that is a part of the botanical and horticultural publications brought together by the late Mr. George W. Vanderbilt on his estate at Biltmore, N. C. This collection formed the working library of the Biltmore Herbarium and was presented by Mrs. Vanderbilt. In 1916 the building on the Biltmore estate was inundated by a local flood which destroyed the larger part of the library, but fortunately many valuable volumes were saved. Some of these are distinct editions of works not heretofore available.

The museum received by transfer a collection of pharmaceutical works from the hygienic laboratory, May 15, 1918. This collection, brought together by Dr. M. G. Motter, the librarian, consists of 932 volumes, 12 pamphlets, and 2,060 periodicals.

The continued interest of Dr. William H. Dall in books for the sectional library of the division of mollusks has resulted in the further enriching of this collection by gift from him of 237 titles during the year. Other contributions to the library were received from Dr. Charles D. Walcott, Dr. O. P. Hay, Dr. C. W. Richmond, Dr. W. H. Holmes, Mr. W. R. Maxon, Dr. G. C. Maynard, Mr. William Palmer, Mr. J. M. Flint, Mr. G. S. Miller, jr., Mr. B. H. Swales, Dr. Ales Hrdlička, Mr. J. P. McLean, and Mr. R. C. Paine.

Accessions.—There were accessioned during the year 3,230 volumes, including 1,010 completed volumes of periodicals, 42 parts of volumes, and 1,529 pamphlets. The number of books in the library is now 137,008, consisting of 52,513 volumes, 124 manuscripts, and 84,371 pamphlets.

Cataloguing.—The cataloguing covered 1,436 volumes, 48 parts of volumes, and 1,938 pamphlets. Four thousand four hundred and twenty section cards were made.

Loans.—Eleven thousand two hundred and thirty-seven books were loaned during the year, of which 2,658 were borrowed from the Library of Congress and 122 from other libraries. The number of books consulted in the reading room is estimated at 6,110.

Binding.—With the additions to the library from the Library of the Biltmore Herbarium and the collection of works from the Hygienic Laboratory, the binding needs have become more acute, but everything is being done to relieve the situation in so far as the funds will allow. One thousand seven hundred and six books were sent to the Government binder during the year, and 841 have been returned.

Technological series.—Additions to the Technological Library, exclusive of duplicates, numbered 281 volumes, 3,863 parts of volumes, 454 pamphlets, and 4 maps. Periodicals entered on records and shelved number 35 volumes and 2,663 parts of volumes. Two hundred and thirty-one cards for books catalogued were filed in the library's catalogue. In the scientific depository catalogue 1,880 author cards were filed and, to 3,762 additional cards, subject headings were added and filed, making a total addition to the catalogue of 5,642 cards.

Duplicates received number 28 volumes, 278 parts of volumes, and 105 pamphlets. These were arranged and filed with the collection of duplicates.

The books and periodicals loaned during the year number 225 volumes and 157 parts of volumes and pamphlets, making a total circulation of 382; 142 completed volumes of periodicals were sent to and returned from the bindery during the year.

Biltmore Herbarium.—Of the collection of 2,000 volumes of works on botanical subjects, 404 titles and 37 files of periodicals have been checked and made ready for cataloguing and entry. Fifty of these volumes had not been represented before in any Washington library. They were accordingly catalogued in detail and it is expected that cards will be printed for them by the Library of Congress.

Pharmaceutical series.—The collection received by transfer from the Hygienic Laboratory numbered 932 volumes and 12 pamphlets. For these 194 accession cards and 160 catalogue cards were made. There were catalogued 78 volumes and 5 pamphlets. Two thousand and sixty periodicals were entered and 324 cards written.

Sectional libraries.—Sectional libraries have been created for the registrar's office and for the war library and the Division of Wood Technology. Following is a complete list of sectional libraries:

Administration.
Administrative assistant's office.
Anthropology.
Biology.
Botany.
Comparative anatomy.
Editor's office.
Ethnology.
Fishes.
Food.
Geology.
Graphic arts.
History.
Insects.
Invertebrate paleontology.
Mammals.
Marine invertebrates.
Materia medica.
Mechanical technology
Mesozoic fossils.
Mineral technology.
Minerals.
Mollusks.
Oriental archeology.
Paleobotany.
Parasites.
Photography.
Physical anthropology.
Prehistoric archeology.
Property clerk.
Registrar's office.
Reptiles and batrachians.
Superintendent's office.
Taxidermy.
Textiles.
Vertebrate paleontology.
War library.
Wood technology.

BUREAU OF AMERICAN ETHNOLOGY LIBRARY.

This library is administered under the direct care of the chief of the bureau, and a report of its operations will be found in the report of that bureau.

ASTROPHYSICAL OBSERVATORY LIBRARY.

The collection of reference works relating to astrophysics has been in constant use. Fifty-eight volumes, 6 parts of volumes, and 43 pamphlets were added during the year.

NATIONAL ZOOLOGICAL PARK LIBRARY.

The library of the National Zoological Park is not extensive, being a strictly working library. Ninety-one volumes were added during the fiscal year.

SUMMARY OF ACCESSIONS.

The accessions during the year, with the exception of the library of the Bureau of American Ethnology, may be summarized as follows:

To the Smithsonian deposit in the Library of Congress, including parts to complete sets	2,773
To the Smithsonian office, Astrophysical Observatory, and National Zoological Park	641
To the United States National Museum	3,230
Total	6,644

Respectfully submitted.

Paul Brockett,
Assistant Librarian.

Dr. Charles D. Walcott,
Secretary of the Smithsonian Institution.

APPENDIX 7.

REPORT ON THE INTERNATIONAL CATALOGUE OF SCIENTIFIC LITERATURE.

SIR: I have the honor to submit the following report on the operations of the United States Bureau of the International Catalogue of Scientific Literature for the fiscal year ending June 30, 1918.

The war in Europe, which has now lasted four years, is throwing ever-increasing difficulties in the way of satisfactorily carrying on the work of the International Catalogue. A number of the countries now engaged in hostilities are falling behind in their subscriptions and the Central Bureau and all of the regional bureaus are having difficulty in obtaining suitable aid to compile and publish the index. The Governments of the countries taking part in the enterprise obviously have prior claims on all services needed in carrying on the war and on this account the Catalogue work has fallen somewhat in arrears. However, it is gratifying to be able to state that approximately two-thirds of the normal number of volumes, which would have been published in time of peace, have been published since the war broke out.

When hostilities began in 1914 the tenth annual issue of the Catalogue had just been completed and in addition 10 volumes of the eleventh issue and one of the twelfth issue. Since the outbreak of war the eleventh and twelfth issues have been completed together with the greater part of the thirteenth issue and part of the fourteenth issue, the actual figures being as follows:

	Volumes.
Eleventh issue	7
Twelfth issue	16
Thirteenth issue	14
Fourteenth issue	4
Total	41

The London Central Bureau of the Catalogue, whose duty it is to edit and publish the references sent in from the various regional bureaus, is dependent entirely for its support on the receipts derived from the subscribers to the Catalogue throughout the world, and as six of the regional bureaus, namely, Germany, Austria, Hungary, Poland, Belgium, and Russia, are in arrears to the extent of almost

$9,000 per annum, it will be necessary to obtain a subsidy from some source to finance the fifteenth annual issue of the Catalogue as was done in 1916 when grants from the Royal Society of London and from the Carnegie Foundation of New York enabled the Central Bureau to make up the first deficit caused by the war and provided funds for the publication of the fourteenth annual issue.

It is felt that every effort should be made to continue the organization as it now stands in spite of present and temporary difficulties caused by the war, for even if the work is delayed and also to some extent incomplete it is obvious that it would be a much simpler and more satisfactory method to continue this great international undertaking until the war is over with the present organization than it would be to reorganize the work should it be allowed at any time to cease or fall too far in arrears. The task of indexing much of the literature being published in the countries mentioned above, whose regional bureaus have closed, has fallen on the London Central Bureau, and already 15,000 reference cards for the German literature of 1915 have been prepared there. Whether it will be possible when peace is restored to resume the former cordial cooperation with all of the now hostile countries is a matter open to serious question, but if this can not be done for some years to come the literature published in those countries could be indexed by the Central Bureau, as is evidenced by the fact that the Central Bureau has already put this plan into operation. These and other questions will, however, have to be finally decided by another international convention after the war.

As has been pointed out a number of times before, the International Convention in London in 1910 authorized a committee to take all necessary steps to obtain further assistance and cooperation from other similar organizations in the preparation of the Catalogue in order to prevent duplication of work. This would not only lead to economy of labor, but would provide scientific workers with a complete and uniform reference to the literature of all sciences. Much is yet to be done in order to completely carry out the intent of the convention, and it can not be too strongly urged that as soon as war conditions allow the complete activities of the Catalogue to be resumed every effort be made to obtain such cooperation.

Not only is it strongly advisable to consolidate and cooperate with the publishers of scientific bibliographies, but also to so broaden the scope of the Catalogue as to include many of the technical industries whose investigations and methods of production are so closely allied with the progress of research in pure science as to render it practically impossible to draw a line of demarcation between pure science and many of the applied sciences.

Many difficulties have arisen to interfere with the work of this Regional Bureau, not only in having the classification properly done, but also in obtaining sufficient clerical assistance to carry on the regular routine.

This in addition to difficulties of forwarding manuscript to London on account of dangers from submarines has reduced somewhat the number of index cards normally issued, but the methods of work have been so readjusted as to meet requirements in spite of temporary chaotic conditions.

Very respectfully, yours,

LEONARD C. GUNNELL,
Assistant in Charge.

Dr. CHARLES D. WALCOTT,
Secretary Smithsonian Institution.

APPENDIX 8.

REPORT ON THE PUBLICATIONS.

SIR: I have the honor to submit the following report on the publications of the Smithsonian Institution and its branches during the year ending June 30, 1918:

The Institution proper published during the year 13 papers in the series of Miscellaneous Collections, 1 annual report, pamphlet copies of 27 papers from the general appendixes of these reports, and 5 special publications. The Bureau of American Ethnology published 1 bulletin and 1 advance separate belonging to a report now in press. The United States National Museum issued 1 annual report, 1 volume of the proceedings, 39 separate papers forming parts of these and other volumes, and 5 bulletins.

The total number of copies of publications distributed by the Institution and its branches was 134,284, which includes 1,591 volumes and separate memoirs of Smithsonian Contributions to Knowledge, 26,412 volumes and separate pamphlets of Smithsonian Miscellaneous Collections, 19,815 volumes and separate pamphlets of Smithsonian Annual Reports, 75,300 volumes and separates of National Museum publications, 7,344 publications of the Bureau of American Ethnology, 2,929 special publications, 14 volumes of the Annals of the Astrophysical Observatory, 44 reports of the Harriman Alaska Expedition, and 676 reports of the American Historical Association.

SMITHSONIAN MISCELLANEOUS COLLECTIONS.

Of the Miscellaneous Collections, volume 66, the title-page and table of contents was published; volume 67, 1 paper; volume 68, 7 papers; in all, 13 papers, as follows:

VOLUME 66.

Title-page and table of contents. 5 pp. (Publ. 2478.)

VOLUME 67.

No. 3. Cambrian Geology and Paleontology. IV, No. 3. Fauna of the Mount Whyte formation. By Charles D. Walcott. May 9, 1917. 59 pp. (Publ. 2480.)

VOLUME 68.

No. 6. Meliaceae Centrali-Americanae et Panamenses. C. de Candolle. July 28, 1918. 8 pp. (Publ. 2479.)

No. 7. Descriptions of two new birds from Haiti. Charles W. Richmond. July 12, 1917. 3 pp. (Publ. 2481.)

No. 8. Water-vapor transparency to low-temperature radiation. Frederick E. Fowle. October 27, 1917. 68 pp. (Publ. 2484.)

No. 9. A new river dolphin from China. Gerrit S. Miller, jr. March 30, 1918. 12 pp. (Publ. 2486.)

No. 10. New rodents from British East Africa. N. Hollister. January 16, 1918. 8 pp. (Publ. 2489.)

No. 11. The Marine Algae and marine Spermatophytes of the Tomas Barrera Expedition to Cuba. Marshall A. Howe. April 9, 1918. 13 pp. (Publ. 2491.)

No. 12. Exploration and field-work of the Smithsonian Institution in 1917. 134 pp. (Publ. 2492.)

VOLUME 69.

No. 3. Atmospheric scattering of light. Frederick E. Fowle. May, 1918. 11 pp. (Publ. 2495.)

No. 6. On periodicity in solar radiation. C. G. Abbot. January, 1918. 8 pp. (Publ. 2499.)

No. 7. Report on aircraft supply of Great Britain and a discussion of the difficulty involved in production. June, 1918. 8 pp. (Publ. 2500.)

SMITHSONIAN ANNUAL REPORTS.

The completed volume of the Annual Report of the Board of Regents for 1916 was received from the Public Printer in December, 1917.

Annual Report of the Board of Regents of the Smithsonian Institution, showing operations, expenditures, and condition of the Institution for the year ending June 30, 1916. IX, 607 pp., 144 pls. (Publ. 2449.)

The general appendix contained the following papers, small editions of which were printed in pamphlet form:

Administration and activities of the Smithsonian Institution. By A. Howard Clark. 19 pp. 22 pls. (Publ. 2450.)

News from the stars. By C. G. Abbot. 12 pp. 5 pls. (Publ. 2451.)

The distances of the heavenly bodies. By W. S. Eichelberger. 11 pp. (Publ. 2452.)

A census of the sky. By R. A. Sampson. 12 pp. 6 pls. (Publ. 2453.)

Gun-report noise. By Hiram P. Maxim. 6 pp. 7 pls. (Publ. 2454.)

Molecular structure and life. By Amé Pictet. 13 pp. (Publ. 2455.)

Ideals of chemical investigation. By Theodore W. Richards. 11 pp. (Publ. 2456.)

The Earth: Its figure, dimensions, and the constitution of its interior. By T. C. Chamberlin, Harry Fielding Reid, John F. Hayford, and Frank Schlesinger. 30 pp. (Publ. 2457.)

Dry land in geology. By Arthur P. Coleman. 18 pp. (Publ. 2458.)

The petroleum resources of the United States. By Ralph Arnold. 15 pp. (Publ. 2459.)

The outlook for iron. By James Furman Kemp. 21 pp. (Publ. 2460.)

The origin of meteorites. By Fr. Berwerth. 10 pp. (Publ. 2461.)

The present state of the problem of evolution. By M. Caullery. 15 pp. (Publ. 2462.)

Some considerations on sight in birds. By J. C. Lewis. 9 pp. 5 pls. (Publ. 2463.)

Pirates of the deep: Stories of the squid and octopus. By Paul Bartsch. 29 pp. 19 pls. (Publ. 2464.)

The economic importance of the diatoms. By Albert Mann. 10 pp. 6 pls. (Publ 2465.)

Narcotic plants and stimulants of the ancient Americans. By W. E. Safford. 38 pp. 17 pls. (Publ. 2466.)

New archeological lights on the origins of civilization in Europe. By Arthur Evans. 21 pp. (Publ. 2467.)

The great dragon of Quirigua. By W. H. Holmes. 14 pp. 10 pls. (Publ. 2468.)

A prehistoric Mesa Verde pueblo and its people. By J. W. Fewkes. 27 pp. 15 pls. (Publ. 2469.)

The art of the great earthwork builders of Ohio. By Charles C. Willoughby. 12 pp. 13 pls. (Publ. 2470.)

A half century of geographical progress. By J. Scott Keltie. 21 pp. 2 pls. (Publ. 2471.)

The relation of pure science to industrial research. By J. J. Carty. 9 pp. (Publ. 2471.)

Mine safety devices developed by the United States Bureau of Mines. By Van H. Manning. 12 pp. 7 pls. (Publ. 2472.)

Natural waterways in the United States. By W. W. Harts. 34 pp. 9 pls. (Publ. 2473.)

Theodore N. Gill. By William H. Dall. 8 pp. 1 pl. (Publ. 2474.)

The life and work of Fabre, by E. L. Bouvier. 11 pp. (Publ. 2475.)

REPORT FOR 1917.

The report of the executive committee and proceedings of the Board of Regents of the Institution and report of the secretary, both forming part of the annual report of the Board of Regents to Congress, were issued in pamphlet form in December, 1917:

Report of the executive committee and proceedings of the Board of Regents of the Smithsonial Institution for the year ending June 30, 1917. 17 pp. (Publ. 2488.)

Report of the secretary of the Smithsonian Institution for the year ending June 30, 1917. 110 pp. (Publ. 2487.)

The general appendix of the report for 1917, which is now in press, contains the following papers:

Projectiles containing explosives, by A. R. Commandant.

Gold and silver deposits in North and South America, by Waldemar Lindgren.

Composition and structure of meteorites compared with that of terrestrial rocks, by George P. Merrill.

Corals and formation of coral reefs, by Thomas Wayland Vaughan.

The correlation of the Quanternary deposits of the British Isles with those of the continent of Europe, by Charles E. P. Brooks.

Floral aspects of the Hawaiian Islands, by A. S. Hitchcock.

Natural history of Paradise Key and the near-by everglades, by W. E. Safford.

Notes on the early history of the pecan in America, by Rodney H. True.

The social, educational, and scientific value of botanic gardens, by John Merle Coulter.

Bird rookeries of the Tortugas, by Paul Bartsch.

An economic consideration of orthoptera directly affecting man, by A. N. Caudell.

An outline of the relation of animals to their inland environments, by Charles C. Adams.

The National Zoological Park, by N. Hollister.

Ojibway habitations and other structures, by David I. Bushnell.

The sea as a conservator of waste and a reservoir of food, by H. F. Moore.

Leonhard Fuchs, physician and botanist, by Felix Neuman.

In memoriam: Edgar Alexander Mearns, by Charles W. Richmond, William Bullock Clark.

SPECIAL PUBLICATIONS.

The following special publications were issued in octavo form:

Publications of the Smithsonian Institution issued between January 1 and March 31, 1917. 1 p. (Publ. 2448.)

Publications of the Smithsonian Institution issued between January 1 and June 30, 1916. 1 p. (Publ. 2482.)

Publications of the Smithsonian Institution issued between January 1 and September 30, 1917. 1 p. (Publ. 2485.)

Publications of the Smithsonian Institution issued between January 1 and December 31, 1917. 3 pp. (Publ. 2490.)

Publications of the Smithsonian Institution issued between January 1 and March 31, 1918. 3 pp. (Publ. 2496.)

PUBLICATIONS OF THE UNITED STATES NATIONAL MUSEUM.

The publications of the National Museum are: (*a*) The annual report to Congress; (*b*) the Proceedings of the United States National Museum; and (*c*) the Bulletin of the United States National Museum, which includes the Contributions from the United States National Herbarium. The editorship of these publications is vested in Dr. Marcus Benjamin.

During the year the Museum published an annual report, one volume of the Proceedings, 39 separate papers forming parts of these and other volumes, and five bulletins.

The issues of the Proceedings were as follows: Volume 51 complete.

The issues of the Bulletin were as follows:

Bulletin 39. Parts A and D, Directions for collecting birds, and Directions for collecting, preparing, and preserving birds' eggs and nests.

Bulletin 67. Directions for collecting and preserving insects.

Bulletin 95. The fishes of the west coast of Peru, by Barton Warren Everman.

Bulletin 97. The Grapsoid crabs of America, by Mary J. Rathbun.

Bulletin 101. The Columbian Institute for the promotion of arts and sciences. A Washington society of 1816–1838, which established a museum and botanic garden under Government patronage, by Richard Rathbun.

Bulletin 102. Part 1, Coal products; Part 2, Fertilizers; Part 3, Sulphur; Part 4, Coal.

BLICATIONS OF THE BUREAU OF AMERICAN ETHNOLOGY.

e publications of the bureau are discussed in Appendix 2. The rial work of the bureau is in charge of Mr. Stanley Searles, r.

ring the year one bulletin and one advance separate from the ty-third Annual Report were issued, as follows:

tin 63. Analytical and Critical Bibliography of the Tribes of Tierra del go and Adjacent Territory, by John M. Cooper. 233 pp. 1 pl.

iian Romance of Laieikawai, by Martha Warren Beckwith. An Advance arate from the Thirty-third Annual Report. 384 pp. 5 pl.

ere are at present four reports and seven bulletins in press.

REPORT OF THE AMERICAN HISTORICAL ASSOCIATION.

e annual reports of the American Historical Association are smitted by the association to the Secretary of the Smithsonian itution and are communicated to Congress under the provisions e act of incorporation of the association.

e annual report for 1915 was published during the year, and the nd volume of the 1914 report. The report for 1916 was in press e close of the fiscal year.

ORT OF THE NATIONAL SOCIETY OF THE DAUGHTERS OF THE AMERICAN REVOLUTION.

he manuscript of the twentieth annual report of the National ety of the Daughters of the American Revolution for the year ng October 11, 1917, was communicated to Congress on June 4, .

E SMITHSONIAN ADVISORY COMMITTEE ON PRINTING AND PUBLICATION.

he editor has continued to serve as secretary of the Smithsonian isory committee on printing and publication. This committee es on all manuscripts offered for publication by the Institution ts branches, and considers forms of routine, blanks, and various r matters pertaining to printing and publication. Thirteen tings were held during the year and 68 manuscripts were acted n.

espectfully sumbitted.

A. Howard Clark, *Editor.*

r. Charles D. Walcott,
Secretary of the Smithsonian Institution.

REPORT OF THE SECRETARY OF THE SMITHSONIAN INSTITUTION

FOR THE YEAR ENDING JUNE 30

1919

(Publication 2547)

WASHINGTON
GOVERNMENT PRINTING OFFICE
1919

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REPORT

OF THE

SECRETARY OF THE SMITHSONIAN INSTITUTION

CHARLES D. WALCOTT

FOR THE YEAR ENDING JUNE 30, 1919.

o the Board of Regents of the Smithsonian Institution.

GENTLEMEN: I have the honor to submit herewith an annual report n the activities and condition of the Smithsonian Institution and its ranches during the year ending June 30, 1919. The activities of the nstitution proper are reviewed in the first part of the report, together ith a brief summary of the affairs of each of the several branches. n the appendices will be found more detailed accounts of the work f the National Museum, the Bureau of American Ethnology, the nternational Exchange Service, the National Zoological Park, the strophysical Observatory, the Smithsonian Library, the Interational Catalogue of Scientific Literature, and an account of the ublications of the Institution and its branches. The reports of the useum and Bureau of Ethnology are published in greater detail separate volumes.

THE SMITHSONIAN INSTITUTION.

THE ESTABLISHMENT.

The Smithsonian Institution was created by act of Congress, in 846, according to the terms of the will of James Smithson, of Engind. who in 1826 bequeathed his property to the United States of merica "to found at Washington, under the name of the Smithonian Institution, an establishment for the increase and diffusion f knowledge among men." In receiving the property and accceptng the trust Congress determined that the Federal Government as without authority to administer the trust directly, and therefore onstituted an "establishment," whose statutory members are "the resident, the Vice President, the Chief Justice, and the heads of the xecutive departments."

THE BOARD OF REGENTS.

The business of the Institution is conducted by a Board of Regents omposed of "the Vice President, the Chief Justice of the United tates, and three Members of the Senate, and three Members of the

House of Representatives, together with six other persons other than Members of Congress, two of whom shall be resident in the city of Washington and the other four shall be inhabitants of some State but no two of them of the same State." The regents elect one of their number as chancellor, usually the Chief Justice, who is the presiding officer of the board, and elect a suitable person as secretary of the Institution, who is also secretary of the board and the executive officer and director of the Institution's activities.

The changes in personnel of the board during the year were the appointment of George Gray, citizen of Delaware, to succeed himself; the appointment of Robert S. Brookings, citizen of Missouri, to fill the vacancy caused by the death of Charles W. Fairbanks. The roll of regents on June 30, 1919, was as follows: Edward D. White, Chief Justice of the United States, chancellor; Thomas R. Marshall, Vice President of the United States; Henry Cabot Lodge, Member of the Senate; Charles S. Thomas, Member of the Senate; Scott Ferris, Member of the House of Representatives; Lemuel P. Padgett, Member of the House of Representatives; Frank L. Greene, Member of the House of Representatives; Alexander Graham Bell, citizen of Washington, D. C.; George Gray, citizen of Delaware; Charles F. Choate, jr., citizen of Massachusetts; John B. Henderson, citizen of Washington, D. C.; Henry White, citizen of Maryland; and Robert S. Brookings, citizen of Missouri.

The board held its annual meeting on December 12, 1918. The proceedings of that meeting, as also the annual financial report of the executive committee, have been printed, as usual, for the use of the regents, while such important matters acted upon as are of public interest are reviewed under appropriate heads in the report of the secretary. A detailed statement of disbursements from the Government appropriations under the direction of the Institution for the maintenance of the National Museum, the National Zoological Park, and other branches will be submitted to Congress by the secretary in the usual manner in compliance with the law.

GENERAL CONSIDERATIONS.

In addition to the usual activities and routine duties, the scientific staff of the Institution continued, until the day of the signing of the armistice, to assist the Government in every way possible toward the successful prosecution of the war. The Museum staff were in constant touch with Army and Navy officials, furnishing much technical information, and the staff of the Astrophysical Observatory conducted numerous valuable researches. Mr. L. B. Aldrich, of the observatory, carried out successful experiments on the pressure exerted by the wind upon projectiles, at the request of the Coast Artillery Station at Fortress Monroe. Assistant Secretary Abbot and Mr.

Aldrich together worked on the problem of searchlights for Army use, and, after numerous experiments, they were able to improve the xisting searchlights, both by diminution of size and increase in lightng power. The new form of searchlight was constructed and used in France several months before the close of hostilities.

At the time of the signing of the armistice several valuable devices were being perfected by Dr. Abbot and the observatory staff, among hem a recoilless gun devised by Dr. R. H. Goddard, of Clark College, which was a development of work being done by him for the Instiution on a multiple-charge rocket intended to reach great heights for neteorological observations; an instrument for determining geographical positions from an airplane or a ship at sea without reference to landmarks, whether celestial or terrestrial; and a rotating projectile constructed on the turbine principle to be fired from a moothbore gun, which would have been specially valuable for use in rench mortars.

On December 16, 1918, Dr. C. G. Abbot, Director of the Astrophysical Observatory, was appointed assistant secretary of the Institution o fill the vacancy caused by the death of Dr. F. W. True some years ago. In addition to his administrative duties in connection with the Institution, Dr. Abbot will be in charge of the Smithsonian Library, he International Exchange Service, and the Astrophysical Observatory.

The work of the National Research Council, of which your secretary was first vice chairman, was continued under the war organization during the first part of the year. After the signing of he armistice every effort was concentrated on the organization of he council upon a peace basis, and this was accomplished very successfully before the close of the year under a definite plan in accordance with an Executive order from the President of the United States requesting the National Academy of Sciences to perpetuate he National Research Council.

The secretary of the Institution was also chairman of the executive ommittee of the national advisory committee for aeronautics, which performed work of great value to the Government on airplane production and improvements.

An important peace-time event was the organizing just before the lose of the year of an extensive exploring expedition to the heart f Africa. The material collected will come to the Institution to be used for purposes of comparison in working up the results of arious expeditions to the Dark Continent by Col. Roosevelt, Paul Rainey, and others.

Bequests.—An important bequest was made to the Institution durng the year by Mrs. Virginia Purdy Bacon, of New York, which will do much toward extending our knowledge of the fauna of the world. That portion of Mrs. Bacon's will relating to the Institution reads as follows:

> (*f*) To Smithsonian Institute the sum of fifty thousand dollars ($50,000), to be used in establishing a traveling scholarship, to be called the Walter Rathbone Bacon Scholarship for the study of the fauna of countries other than the United States of America; the incumbents to be designated by said Institute under such regulations as it may from time to time prescribe and to hold such scholarships not less than two years, and while holding such scholarship to conduct for said Institute investigations in the fauna of other countries under the direction of said Institute.

The terms of the will had not been executed at the close of the year.

FINANCES.

The invested funds of the Institution are as follows:

Deposited in the Treasury of the United States under authority of Congress	$1,000,000.00

CONSOLIDATED FUND.

Brooklyn Rapid Transit 5 per cent notes, due July 1, 1918	3,528.44
American Telephone & Telegraph Co. 4 per cent collateral trust bonds, due July 1, 1929	15,690.00
Province of Manitoba 5 per cent gold debentures, due Apr. 1, 1922	1,935.00
West Shore Railroad Co. guaranteed 4 per cent first mortgage bonds, due Jan. 1, 2361	37,275.00
Cleveland Electric Illuminating Co. first mortgage 5 per cent gold bonds, due 1939	5,670.00
United States first Liberty loan	200.00
United States second Liberty loan	100.00
United States third Liberty loan	10,150.00
United States fourth Liberty loan	50.00
United States war-savings stamps, series of 1918	100.00
Adjustments	105.94
Total	1,074,794.38

The sum invested for each specific fund and the manner in which the several investments were made is given in the following statement:

	United States Treasury.	Consolidated fund.	Total.
Smithson fund	$727,640.00	$984.00	$728,624.00
Habel fund	500.00		500.00
Hamilton fund	2,500.00		2,500.00
Hodgkins general fund	116,000.00	37,275.00	153,275.00
Hodgkins specific fund	100,000.00		100,000.00
Rhees fund	590.00	74.00	664.00
Avery fund	14,000.00	14,824.45	28,824.45
Addison T. Reid fund	11,000.00	1,348.00	12,348.00
Lucy T. and George W. Poore fund	26,670.00	2,819.00	29,489.00
George K. Sanford fund	1,100.00	142.00	1,242.00
Chamberlain fund		10,000.00	10,000.00
Bruce Hughes fund		7,327.93	7,327.93
Total	1,000,000.00	74,794.38	1,074,794.38

The Brooklyn Rapid Transit Co. was placed in the hands of receivers on July 1, 1918.

For the $5,000 in 5 per cent gold notes which failed of redemption on the above date, $1,500 was subsequently paid to the Institution in cash and the balance of $3,500 is held by the receivers pending final adjustment.

A single piece of real estate bequeathed to the Institution by the late Robert Stanton Avery, and located in the District of Columbia, 326 A Street SE., was sold and the sum of $3,046.50 was realized therefrom. Several lots of unimproved land located near Lowell, Mass., and forming a part of the bequest known as the Lucy T. and George W. Poore fund, were also sold and the sum of $520.50 was realized, making a total of $3,567 derived from the sale of real estate during the year.

Income not required for current expenditures continues to be placed with local banks on time deposit; the interest so earned during the year amounted to $1,048.10.

The income of the institution during the year, amounting to $144,100.53, was derived as follows: Interest on permanent investments and other sources, $64,466.94; repayments, rentals, publications, etc., $34,723.33; contributions from various sources for specific purposes, $26,343.26; bills receivable, $15,000; proceeds from sale of real estate, $3,567.

Adding the cash balance of $1,289.90 on July 1, 1918, the total resources for the year amounted to $145,390.43.

Mr. B. H. Swales, honorary custodian, section of birds' eggs, has contributed $300 to the Institution for the purchase of specimens.

The disbursements which are described in the annual report of the executive committee amounted to $143,267.65, leaving a balance on deposit with the Treasury of the United States in cash and in bank of $2,122.78.

The Institution was charged by Congress with the disbursement of the following appropriations for the year ending June 30, 1919:

International exchanges	$35,000
American ethnology	42,000
International catalogue of scientific literature	7,500
Astrophysical observatory	13,000
National Museum	
Furniture and fixtures	15,000
Heating and lighting	55,000
Preservation of collections	300,000
Building repairs	10,000
Books	2,000
Postage	500
National Zoological Park	115,000
Increase of compensation (indefinite)	
Total	595,000

In addition to the above, there was included under the general appropriation for printing and binding an allotment of $76,200, to cover the cost of printing and binding the Smithsonian annual report and reports and miscellaneous printing for the Government branches of the Institution.

RESEARCHES AND EXPLORATIONS.

The institution every year sends out or cooperates in expeditions to various parts of the world for the purpose of gathering all the information possible on the inhabitants, the fauna and flora, and other features of little-known regions, and thus carries out one of its primary objects—"the increase of knowledge." While the war conditions prevailing during the first half of the year blocked certain projects, several expeditions of importance to science were undertaken, and a few of these are briefly summarized here. The annual Exploration Pamphlet issued by the institution and the reports of the various branches describe these and other researches more in detail.

GEOLOGICAL EXPLORATIONS IN THE CANADIAN ROCKIES.

The geological explorations which have been conducted in the Canadian Rockies by your secretary for a number of years were continued during the summer season of 1918, chiefly for the purpose of determining the geological structure of the upper Bow Valley north of Lake Louise, Alberta, and also at the headwaters of the Cascade River, at Sawback Lake. Another aim of the investigation was to locate any possible occurrences of unusual beds of fossils in the regions visited.

Leaving the Canadian Pacific Railway at Lake Louise Station, the Bow Valley extends to the northwest parallel to the Continental Divide, which forms its southwestern side. Bow Lake at the head of the valley is a beautiful sheet of water hemmed in by bald mountain slopes and cliffs on the west and north and by the mass of Mount Molar on the east. From the west numerous glaciers drain into the lake. The first one encountered is Crowfoot, which flows from the great Wauputek snow field along the Continental Divide.

Bow Pass, 4 miles north of the head of Bow Lake, has been eroded by glacial action into a broad, park-like area, so that the passage over into the valley of the Mistaya River of the Saskatchewan River drainage is scarcely realized until steep slopes indicate the approach toward Lake Peyto. This beautiful lake, with a glacier at its head, drains into the Mistaya River. The bold escarpment on the north side of the lake is continued to the north down the Mistaya River to the Saskatchewan. Several sections were examined along this front.

which were found to be similar to the section at the head of Bow Lake.

The broad canyon valleys that unite the headwaters of the Saskatchewan River are all carved by erosion out of the same type of Cambrian rocks as those exposed in the vicinity of Bow Lake, and also in the Bow Valley south of Lake Louise Station.

At the close of the season a fine pair of mountain sheep, a black bear, one mule deer, a mountain goat, and a wolverine were collected, the skins and skulls being shipped to the National Museum.

GEOLOGICAL WORK IN THE MIDDLE ATLANTIC STATES.

During the field season of 1918 the members of the geological staff were chiefly occupied in collecting material for the museum exhibition series, most of the work being done in Virginia, Maryland, New Jersey, Pennsylvania, and New York. Sufficient material illustrating the weathering and decay of rocks was obtained by Dr. J. C. Martin, assistant curator of geology, United States National Museum, to make up 100 sets for distribution to those agricultural and other colleges which give instruction in rock weathering and soil formation. Dr. Martin also visited several localities in Pennsylvania, New Jersey, and New York for the purpose of filling certain gaps in the ore and rock collections.

In continuance of the search begun in recent years for large exhibition museum specimens to illustrate the various phases of structural geology and stratigraphic paleontology, Drs. Bassler and Resser, of the division of paleontology, report as follows:

> Field work was begun with an investigation of the Cretaceous rocks of western New Jersey, where the prime object was to secure suitable exhibits of such economically important rocks of organic origin as glauconite, or greensand, and calcareous marl. The greensand area in the vicinity of Vincentown, N. J., afforded the best results in fossil and rock specimens for both study and exhibition. The very incoherent greensand could not be obtained in masses of a size suitable for exhibition, but by use of shellac a large piece was hardened sufficiently to be shipped to Washington without breakage. In the marl pits unusually well-preserved fossils were found scattered through an unconsolidated sand formation. Here specimens abound literally by the millions, and large numbers were collected by passing quantities of the sand through a fine-meshed sieve, the residue in this process usually consisting of nothing but well-preserved fossils.
>
> They then proceeded to the Lancaster Valley of Pennsylvania, where they were fortunate enough to secure intact a large mass of finely banded, crinkled limestone. This illustrates, on a small scale, the folding to which the earth's crust has been subjected, and forms a much-needed addition to the exhibits.
>
> On the east front of the Allegheny Mountains Dr. Bassler obtained exhibition specimens illustrating faulting and its accompanying phenomena. In western Maryland a fault passes through a Silurian conglomerate composed of small, rounded pebbles of pure white quartz, forming an interesting educational ob-

ject, and along the fault zone the conglomerate has been broken into angular fragments and recemented together into a hard rock. In one case this recementation had been caused by silica and in another by iron ore. Large examples of both kinds of this fault breccia were collected. Photographs of these specimens in situ were secured so that explanatory exhibition labels can be illustrated.

THE COLLINS-GARNER FRENCH CONGO EXPEDITION.

In December, 1916, an expedition known as the "Collins-Garner Expedition in the interests of the Smithsonian Institution" sailed from New York for Bordeaux and from there to Africa, with the object of procuring a general collection of vertebrates and especially the great apes. The expedition encountered many difficulties and delays owing to the war, but by the summer of 1918 they had established permanent headquarters near Fernan Vaz, French Congo. A letter from Mr. R. L. Garner, who has the general management of the expedition, states in part:

> Our domicile is located on the edge of a vast plain, traversed here and there by belts and spurs of forest. In those plots of bush live great numbers of chimpanzees, and for the first time in my long experience among them I have seen whole families of them out on the open plain. Frequently they cross the plain from one belt of bush to another, in some places a mile or so in width, and not a tree or bush in that distance to shelter them from attack. They often come within 200 to 300 yards of my house and sometimes manifest deep interest in trying to find out what this new thing is set up in their midst. I have seen as many as four or five different groups of them in the same day, and one of these contained 11 members.
>
> Mr. Aschemeier has collected well on to 2,000 specimens, and nearly all of them he has killed with his own gun. Some of these specimens are exceedingly rare and valuable. When you recall the fact that he came as taxidermist of the expedition and not as chasseur, he was not expected to provide the specimens that he was to preserve.
>
> We have forwarded six consignments of specimens to the Museum and have a seventh well on the way; but we find great difficulty in getting the steamers to take them from Port Gentil (Cap Lopez), because they are all under the direction of the French military authorities. Two of our last shipments were still at Port Gentil last month, where one of them has been lying since last January and all steamers declined to take it. Once both shipments were taken aboard the steamer and bill of lading signed when the captain changed his mind and sent the whole lot back on shore, with the accumulated charges of 40 francs for embarkation and debarkation.
>
> We have sent 12 or 13 specimens of buffalo, several specimens and species of antelope, and two or three fine specimens of the "red river hog," beside a large collection of monkeys, representing six or seven species of both sexes and various ages. I think in all we have sent over 1,500 up to this time. Of course, this includes birds, etc., not insects, and we have on hand a goodly number.

War conditions seriously interfered with the shipment of the material collected, but later on a large number of interesting specimens were received by the Museum.

THE SMITHSONIAN AFRICAN EXPEDITION.

Shortly before the close of the fiscal year a collecting expedition to Africa was organized, to be known as the Smithsonian African Expedition, under the direction of Edmund Heller, in conjunction with the Universal Film Manufacturing Co. The expedition sailed from this country a few days after the close of the year for Cape Town, Africa, from which city arrangements were to be made for the plunge into the interior of the continent. The expedition is to collect animals, plants, and other material for uses of comparison in working up the collections made in Africa by Col. Theodore Roosevelt, Paul Rainey, and others, already in the National Museum. Representatives of the Universal Film Manufacturing Co. accompanied the expedition to make extensive motion pictures of life in the mysterious interior. The expedition will explore the jungles, deserts, lakes, and rivers and will be out at least a year.

Exploration is contemplated in various parts of the Cape region, the great Victoria Falls of the Zambesi River, and western Rhodesia. From there the expedition will cross to the sources of the Congo in Belgian Congo, then turn east toward Lake Tanganjika, following, to some extent, the trails of Livingston and Stanley in this region. From the town of Ujiji, on the eastern shore of the lake, the temporary headquarters of the expedition, excursions will be made into the former German East Africa and the Uganda Protectorate, especially the Ryvenzori Mountain region.

The primary purpose of the expedition is to secure additional specimens of plants and animals, chiefly from the interior and from South Africa, in which the Museum is rather deficient. These will prove a welcome supplement to the magnificent collections brought home by Col. Theodore Roosevelt and others and on which monographic reports are desired, but which can not be worked up intelligently and satisfactorily until more material is obtained. The experienced collectors, Mr. H. C. Raven, representing the institution, and Dr. H. L. Shantz, of the Department of Agriculture, will undoubtedly send back to this country much material of value concerning the little-known parts of the "Dark Continent" which have puzzled scientists and laymen for a long time.

BOTANICAL EXPLORATIONS IN ECUADOR.

As a part of a cooperative plan for an investigation of the flora of northern South America, organized by the United States National Museum, the New York Botanical Garden, and the Grey Herbarium, Dr. J. N. Rose, associate curator in the division of plants of the Museum, spent three months making botanical collections in Ecuador. A large quantity of desired material, including 6,000 botanical specimens, 100 jars of fruit seeds and plant products preserved in formalin, a number of wood specimens, and samples of bark, was collected. It is expected that this and other proposed botanical researches in this region will be of much value to the agricultural and horticultural interests in this country.

In the course of Dr. Rose's work in Ecuador two sections were made of the coast across the western range of the Andes to the interior Andean Valley; one in the south from Santa Rosa to Loja. and the other near the center of the country from Guayaquil to Riobamba. A longitudinal section was made down the Andean Valley from San Antonio to Loja. This last section was over the route followed by Alexander von Humboldt at the beginning of the eighteenth century. Many of the plants collected by him on this memorable journey were re-collected.

CINCHONA BOTANICAL STATION.

With the consent of the governor of Jamaica the three-years' lease of the Cinchona Botanical Station, held by the institution, was canceled during the period of war, as it was found impracticable to undertake any botanical research there during the unsettled conditions prevailing. The lease was terminated, however, with the hope that it could be taken up again with the return of normal conditions, and a few days after the close of the fiscal year a letter was received from Prof. Duncan S. Johnson, chairman of the committee of subscribers to the maintenance of the station, at that time in Jamaica, stating that he had begun negotiations with the Government to renew the lease, beginning January, 1920.

ANTHROPOLOGICAL WORK IN PERU AND BOLIVIA.

Mr. Philip A. Means, honorary collaborator in American archeology, United States National Museum, spent some months during the year in archeological work in Peru and Bolivia. The region around Lima, according to Mr. Means, is undoubtedly one of the richest in South America from the archeological standpoint. After visiting a number of the ancient ruins in this section, considerable time was spent in examining the archeological collections of several South American scientists. In an account of his work, Mr. Means says:

> Two of the least known places visited were Maranga and Pando. They are very close together, and are about 6 miles northwest of Lima. In its prime, Maranga had four fine terraces, with a spacious terreplein at the top. At the bottom the pyramid is about 450 feet square and the summit terreplein is about 250 feet by 350. The material of construction is adobe. This pyramid is probably of Inca construction; it is much like the Inca-built Temple of the Sun at Pachacamac and has yielded many Inca artifacts.
>
> Lying somewhat north and northwest of Maranga are the ruins of Pando. These cover an immense amount of ground, and consist of several pyramids

even larger than Maranga, but not so well preserved. The old city at this place was inclosed in a massive wall, with easily defended gateways. These latter were narrow, and, at either side, sunk in the thickness of the wall, there was a raised platform or niche where possibly a guard could stand and effectually oppose ingress.

At the western side of Pando there are the remains of a fine, though small, palace or temple. Although it is only about 85 feet spuare, this little building is remarkable on account of the attractive arabesque patterns made in the stucco coating of the walls. The western end of the main room was provided with a platform, raised some 3 feet above the rest of the floor. Behind this there was a passage which led to other apartments. It is not now possible to know exactly what sort of roof there was, for the wind has eroded the tops of the walls and signs of roof beams or joists are no longer visible.

THE PROPOSED ROOSEVELT MEMORIAL.

On January 29, 1919, a bill was introduced in the House of Representatives by Congressman F. C. Hicks, providing for the erection of a museum of history and of the arts as a memorial to Theodore Roosevelt. It was intended that the proposed museum would contain the extensive collections already in the National Museum of relics and mementoes of illustrious patriots of our country and of the events conspicuous in its history. The bill provides that the building should be planned and erected under the direction of the Regents of the Smithsonian Institution, and, when completed, would be administered by them. The site selected is the north side of the Mall, on a line with the present beautiful structure of the Natural History Building of the National Museum.

The memorial museum would contain also collections relating to arts and industries, including the great divisions of mechanical and mineral technology, such as objects and models illustrating the development of the electric telegraph and telephone; the phonograph; transportation by land, water, and air; musical instruments, from primitive to present forms; printing, illustrating, and bookmaking; photography, from the earliest invention to the modern moving-picture apparatus; ores and minerals, their natural occurrence, processes of extraction and manufacture, from the native state to the finished product; textiles; drugs; foods; and animal and vegetable products.

Provision would also be made for the present National Gallery of Art, in the development of which President Roosevelt took an active and timely interest. The collections of the National Gallery now approximate $1,000,000 in value, and would grow more rapidly if adequate installation were insured.

In my letter to Congressman Hicks regarding the memorial, I stated, in part, as follows:

> The proposed museum would not be a dead memorial, but a virile living tribute to Roosevelt that for ages would serve to educate and stimulate all classes of Americans. Its educational value would be great to the child, the

youth, and mature men and women. It would stimulate the historian, artist, designer, manufacturer, and artisan, and bring to the American people in the most realistic manner the extent and character of their historical and industrial development, and place side by side with the American many of the developments in art and science of other lands. I can not conceive of a more powerful influence for good that could take the form of a memorial to Roosevelt.

We have the great monument to Washington, the great mausoleum to Lincoln, and if on the same great parkway between the Capitol and the Potomac this tribute to Roosevelt could be erected it would be a tribute worthy of what he himself stood for in the life and thought of our country.

The bill providing for this memorial to Theodore Roosevelt was not brought up before the Congress for action during the session at which it was introduced, but it was reintroduced on May 21, 1919, during the first session of the Sixty-sixth Congress, and at the close of the fiscal year was still in committee.

RESEARCH CORPORATION.

The Research Corporation, mentioned in several previous reports, is the outgrowth of the gift to the Smithsonian Institution by Dr. F. G. Cottrell of his patents covering the electrical precipitation of suspended particles.

The process is now in successful operation in a number of smelting and refining plants in which the precipitation of fumes is an important item. From the income of these applications there was established a fellowship, amounting to $2,500 each year, for research along technical lines.

POPULAR SCIENTIFIC LECTURES.

In furthering one of the purposes of the Institution, "the diffusion of knowledge," a series of popular scientific lectures, illustrated by lantern slides, was instituted during the year, and given in the auditorium of the National History Building of the Museum. These lectures were open to the public and were all well attended, showing the interest of the people of Washington in scientific matters. Eight lectures were given in the series, on alternate Saturday afternoons, as follows:

1. Photographing in the Canadian Rockies, by Charles D. Walcott.
2. Sun Rays in Many Lands, by C. G. Abbot.
3. The Indian as a Stone Mason, by J. Walter Fewkes.
4. Meteorites and Shooting Stars, by George P. Merrill.
5. The Story of Our Local Aboriginies, Historic and Prehistoric, With Demonstrations of Their Instrument Making, by William H. Holmes.
6. Harmful and Beneficial Insects, and How the National Museum Helps in Their Study, by L. O. Howard.
7. The Story of Silk, by Frederick L. Lewton.
8. Why the Wild Flowers Are So Wild, by Frederick V. Coville.

It is intended to continue these lectures during the coming year.

CONGRESS OF AMERICANISTS.

The twentieth international congress of Americanists which was to have been held at Rio de Janeiro in June, 1919, was postponed until the following year, when more favorable conditions may be expected.

PUBLICATIONS.

The institution and its branches issued during the year 98 volumes and separate pamphlets. The total distribution was 161,288 copies which includes 404 volumes and separate memoirs of Smithsonian Contributions to Knowledge, 15,603 volumes and separate pamphlets of Smithsonian Miscellaneous Collections, 13,885 volumes and separates of the Smithsonian Annual Reports, 118,332 volumes and separates of the National Museum publications, 11,483 publications of the Bureau of American Ethnology (all series), 1,444 special publications, 10 volumes of the Annals of the Astrophysical Observatory, 69 reports of the Harriman Alaska Expedition, and 58 reports of the American Historical Association.

An unusually large number of publications were in press at the close of the year, owing to the overcrowded condition of the Government Printing Office during the war.

Allotments for printing.—The allotments for the year for the printing of the Smithsonian report and the various publications of the branches of the Institution were practically used up and the allotments for the year ending June 30, 1920, are as follows:

For the Smithsonian Institution: For printing and binding the annual reports of the Board of Regents, with general appendices, the editions of which shall not exceed 10,000 copies	$10,000
For the annual reports of the National Museum, with general appendices, and for printing labels and blanks and for the bulletins and proceedings of the National Museum, the editions of which shall not exceed 4,000 copies, and binding in half morocco or material not more expensive, scientific books and pamphlets presented to or acquired by the National Museum Library	37,500
For the annual reports and bulletins of the Bureau of American Ethnology and for miscellaneous printing and binding for the bureau	21,000
For miscellaneous printing and binding:	
International exchanges	200
International Catalogue of Scientific Literature	100
National Zoological Park	200
Astrophysical Observatory	200
For the annual report of the American Historical Association	7,000

Committee on printing and publication.—All manuscripts offered for publication by the Institution or its branches are considered by the Smithsonian advisory committee on printing and publication. Thirteen meetings were held during the year and 79 manuscripts were acted upon. The membership of the committee is as follows: Dr. Leonhard Stejneger, head curator of biology, National Museum, chairman; Mr. N. Hollister, superintendent of the National Zoological Park; Dr. George P. Merrill, head curator of geology, National Museum; Dr. J. Walter Fewkes, chief of the Bureau of American Ethnology; and Mr. A. Howard Clark, editor of the Institution and secretary of the committee until his death in December, 1918, when Mr. Webster P. True succeeded him as editor and secretary of the committee.

LIBRARY.

The library of the Smithsonian Institution is maintained for the purpose of assembling a collection of periodicals and publications of a scientific nature, as well as the journals and other publications of scientific institutions of the world, the whole forming a library of reference and research. In addition to the main bulk of titles housed in the Library of Congress, and known as the Smithsonian Deposit, there are 35 sectional technical libraries and 4 branch libraries—the National Museum library, the Bureau of American Ethnology library, the Astrophysical Observatory library, and the National Zoological Park library.

The number of accessions during the year which were added to the previous collection of over half a million titles numbered 7,502. Of these 2,077 were for the Smithsonian Deposit, 639 for the Smithsonian office, Astrophysical Observatory, and National Zoological Park, and 4,786 for the National Museum.

Seventy-eight titles have been added during the year to the institution's collections of aeronautical publications, in which continued interest has been shown by aeronautical research workers in the Army, Navy, and scientific institutions. Author cards for 1,722 titles of books in the De Peyster Collection have been made, and the 869 volumes on French history have been made accessible.

In the Museum library the most important acquisition was a set of catalogues of the J. Pierpont Morgan art collection, presented by J. Pierpont Morgan, jr. The technological library added 346 volumes, and the books in the sectional library, division of plants, have been revised and all available works on botanical subjects brought together and rendered accessible. The collection in the art room, statuary, as well as books, has been carefully gone over and put in thorough order.

NATIONAL MUSEUM.

The National Museum suffered the loss at the beginning of the year of the assistant secretary in charge, Mr. Richard Rathbun, who died July 16, 1918. His duties devolved upon Mr. W. de C. Ravenel, the administrative assistant, whose title was changed to administrative assistant to the secretary, and on November 1 was also designated director of arts and industries.

The scope of the National Museum embraces many subjects, which may be classed under the following headings:

1. Natural history.
2. Applied science and art (Arts and Industries).
3. The fine arts (the National Gallery of Art).
4. American history.

These various departments are combined under one administration, which insures greater economy and efficiency in management.

During the war the Museum furnished the Bureau of War Risk Insurance with 138,600 square feet of space for its offices. Members of the Museum staff in all departments continued to render service to the various governmental agencies until the signing of the armistice, and their work was successful in bringing the Museum into closer relationship with the executive departments.

The total number of accessions received during the year was 526,845, classified and assigned as follows: Department of Anthropology, 12,333; Zoology, 442,383; Botany, 40,357; Geology and Mineralogy, 4,750; Paleontology, 26,050; Textiles, etc., 884; Mineral Technology, 62; and National Gallery of Art, 26. Three thousand and ninety-six articles were loaned for exhibition, mainly for the divisions of history and American archeology and the Gallery of Art. Purchases were made from the Frances Lea Chamberlain funds and the Henry Ward Ranger funds.

During the year the Museum began the collection of a most valuable and interesting series of war relics. One of the most instructive features of this collection is an exhibit showing the development of the airplane, from the original Langley models to the first Government-owned aeroplane of the world, purchased by the United States from the Wright Brothers in 1909. Through the director of military aeronautics, Bureau of Aircraft Production, two types of planes used by the French at the front in 1917 were received, and a Curtiss training plane of the model used at flying fields all over the United States, as well as the first battle plane constructed in this country for the United States Government—the DH-4—made by the Dayton-Wright Airplane Co. in 1917. This machine was flown over 100,000 miles.

The Department of Anthropology received exceptionally large additions relating to the war with Germany. They include the Combined Order of Battle Map, corrected to November 11, 1918, with its accessories, as used by Gen. Pershing and his staff at Chaumont, France, throughout the progress of the American military movements; a collection of German military paraphernalia captured by American troops during various engagements; collections of the equipment of the various branches of the American Army; and an almost complete series of uniforms, insignia, decorations, and medals of the Army and Navy, as well as a collection of relics of Lieut. Benjamin Stuart Walcott, United States Army, who entered the French air service as a member of the Lafayette Flying Corps, and who was killed in aerial combat on December 12, 1917.

Another interesting addition consists of a large series of costumes and accessories worn by the late Richard Mansfield in his extensive repertoire of historic characters, presented by Mrs. Mansfield.

The chief addition in the Department of Biology was a collection of Antillean land mollusks, aggregating 400,000 specimens, donated by Mr. John B. Henderson, a regent of the Smithsonian Institution. The final installment of Dr. Abbott's Celebes collections was received likewise. The collections in the National Herbarium were enriched by a donation of 12,000 plants from Mexico, 9,600 from the Philippines, and many from the South American countries.

The Division of Textiles received for exhibition purposes from the office of the Surgeon General of the United States Army a collection consisting of apparatus, hospital appliances, and field equipment used by the Medical, Dental, and Sanitary Corps in the war. This included examples of all kinds of equipment of a thousand-bed hospital overseas. The food exhibits were continued and an arrangement was made with the States Relations Service of the Department of Agriculture, whereby regular demonstrations of the value, use, preparation, and conservation of foods were given. Over 2,100 persons attended the lectures and various demonstrations.

Work on the Freer Building progressed satisfactorily, and it is expected that the structure will be completed early in 1920. The National Gallery of Art acquired from Mr. Ralph Cross Johnson a rare gift of 24 paintings, which comprises selections from the work of 19 of Europe's foremost masters.

The most pressing needs of the Museum are a separate building for the National Gallery of Art, which has long since outgrown its present temporary quarters, and also one for American history. It is likewise imperative to increase the scientific and technical staff in order that the Institution may keep pace with the rapid development of the country.

e total distribution of Museum publications during the year gated 118,332 copies. Over 4,000 volumes, pamphlets, and nd papers were added to the library, which now contains 5 volumes and 87,109 pamphlets and unbound papers.

BUREAU OF AMERICAN ETHNOLOGY.

e usual activities of the Bureau of American Ethnology, defined w as "ethnological researches among the American Indians, in- ng the excavation and preservation of archeologic remains," been carried on during the year under the direction of Dr. J. er Fewkes, chief. Intensive studies were made of the dying lan- s of the numerous Indian tribes in order to discover the rela- ip of the various stocks of the aborigines and to gain a clearer t into the origin, history, and migration of man on this con- . The continued study of the material culture of the Indians as its practical value, while another instructive line of work s to the history of the Indians both before and after the advent ropeans.

ld researches include, in addition to those mentioned above, cavation and preservation of archeological remains. A few of researches are mentioned very briefly here in order to show the e of the work. A somewhat more detailed account of these and undertakings of the bureau during the year will be found in an dix hereto. Valuable work was done by Dr. Fewkes in the mo and tributary canyons in Colorado and in Utah as far west ntezuma Canyon, on the aboriginal castles and towers of that , and through his efforts the Aztec Spring Ruin was presented e owner, Mr. Henry van Kleeck, of Denver, to the National Service, and accepted by the Secretary of the Interior.

J. R. Swanton, ethnologist, devoted much of his time to the tion of material from published sources for a study of the mic background of the life of the American Indians north of o. He has also continued his study of the languages of the ns of the lower Mississippi Valley and of the social systems of hoctaw and Chickasaw Indians.

J. N. B. Hewitt, ethnologist, prepared for the press the daga version of the Myth of the Beginnings, the Genesis Myth Iroquoian peoples, and continued his previous study of the .

Francis LaFlesche, ethnologist, is now completing for publica- is notes on the rite of the chiefs, the tribal rite of the Osage . In this ritual is embodied the story of the four stages of the pment of the tribal government, including both the military and the civil forms, beginning with the chaotic state of the tribal existence.

Mr. J. P. Harrington, ethnologist, has obtained important corroborative evidence of the validity of his discovery that there is a close genetic relationship between Tanoan pueblo dialects of New Mexico and the Kiowa. The bearings of this discovery on theories of the origin of modern Pueblos is very significant.

Special research work was done among the Salish Tribes, the Pawnee, and Chippewa. Dr. Walter Hough, curator of ethnology, United States National Museum, undertook archeological work in the White Mountain Apache Reserve, Arizona, and Mr. Neil M. Judd, curator of American archeology, United States National Museum, successfully investigated five prehistoric ruins in the Cottonwood Canyon caves. Dr. Aleš Hrdlička, curator of physical anthropology, United States National Museum, was detailed to make an examination of the remains of southwestern Florida, especially of the shell heaps along the coast south of Key Marco. Mr. Gerard Fowke has made careful detailed study of the numerous caves in the Ozark region of central Missouri, and also transmitted a valuable collection of relics to the Museum.

The number of publications distributed was 11,483, an increase of 4,139 over the number sent out last year. The library accessioned 380 new books and 210 pamphlets.

INTERNATIONAL EXCHANGES.

The total number of packages handled by the International Exchange Service during the year was 270,860, an increase over the number for the previous year of 3,914. Although it has not yet been possible to put the service on a prewar basis as far as the shipment of consignments abroad is concerned, shipments in boxes are being made as frequently as present conditions will permit to all countries except Austria, Bulgaria, Germany, Hungary, Montenegro, Roumania, Russia, Serbia, and Turkey.

The exchange service has continued its policy of international helpfulness in procuring publications desired by governmental and scientific establishments both abroad and at home. As an instance of this service, sets as nearly complete as possible of posters relating to the war were assembled and transmitted to the British Museum at their request, a similar service having been rendered to the French Government the previous year. Owing to the excessive charges on ocean freight, many packages were sent by mail.

Late in the fiscal year shipments to Belgium and the northern neutrals were resumed. The chief of the Belgian Service of International Exchanges said, in part, in a letter to the office here:

> I should fail most lamentably in my duty, Mr. Secretary, if I did not add to nis reply warm thanks in the name of the Belgian Government, in the name of ur scientific establishments and institutions, and in my own name, for the exreme kindness you have shown us in reserving for us until the present time all he numerous "series" and "collections" (one and all of inestimable value) hich the war has prevented you from transmitting to us at the proper time.

THE NATIONAL ZOOLOGICAL PARK.

The National Zoological Park continues in popularity as a means f natural history education and as a place of recreation and amusenent for the people of Washington.

The total number of animals in the park at the close of the fiscal ear was 1,336, including 528 mammals, 71 reptiles, and 737 birds. Among the more important additions were two young Sumatran lephants, purchased at a cost of $5,000, for the children of Washngton by a number of their friends and donated to the institution. At the time of their arrival they were about 2½ years old and were the irst of their kind to be exhibited in Washington. Other important dditions were a fine capybara, from the Hon. Henry D. Baker, Trinidad, British West Indies; a great white heron of southern Florida, from Dr. Paul Bartsch; and a pair of Florida bears from Mrs. A. V. N. Stroop.

Visitors to the park during the year numbered 1,964,715—a daily verage of 5,383. Ninety-eight schools and classes visited the colection for instruction purposes.

Among the recent improvements are exterior cages for leopards, guars, and hyenas, and a new chimney for the central heating lant. A part of the creek-side drive was rebuilt, some animal ouses were painted, and small improvements in the animal houses nd yards were likewise effected.

The need of a new house for the exhibition of birds continues to ecome more urgent from year to year. An increased appropriation or the expenses of the park is also badly needed, as well as one ufficient for the purchase and transportation of animals, so that the ark may take advantage from time to time of opportunities to btain rare and conspicuous animals not before exhibited. The urchase of a frontage of over 600 feet on Connecticut Avenue, rged for several years by the superintendent, but which has not et been considered favorably by Congress, would satisfy all the eeds of the park as regards necessary expansion and better service o the public on the west side; and it becomes more and more imortant to secure this land, as the probability of losing the opporunity increases every year. It is also desirable to purchase a small rip of privately owned land between the park and the important ighway of Adams Mill Road, because of improvements being made at that point by the District government. The incorporation of this land within the park is of very great interest to the public.

The slight increase in the annual appropriation granted by Congress scarcely more than covered the increased cost of maintenance of the park, even by practicing the strictest economy. Lack of funds for grading banks and filling ravines has prevented the completion of work begun three years ago for the purpose of obtaining new level spaces for yards and inclosures.

ASTROPHYSICAL OBSERVATORY.

Several important investigations relating to the war, begun last year, were continued by the staff of the Astrophysical Observatory under the general direction of Dr. C. G. Abbot, in addition to the regular work of the observatory. These researches are mentioned elsewhere in this report under the heading "General considerations."

At Washington work on solar radiation computations has gone on steadily, and progress has been made with the preparation of a new medium, potassium iodide, for the investigation of the rays beyond where rock salt is transmissible. A new instrument, based upon the principle of the perfect radiator, or "absolutely black body," was constructed for the purpose of measuring nocturnal radiation, such as the earth sends out to space. At the close of the year this instrument was reported as operating successfully on Mount Wilson.

In view of the fact that the total eclipse of the sun of May 29, 1919, would be visible at La Paz, Bolivia, which is not very far from the Smithsonian solar constant observing station at Calama, Chile, a successful expedition was undertaken by Dr. Abbot, with the double purpose of observing the eclipse and visiting the Calama station. Good photographs of the phenomenon and also pyranometric observations by Mr. A. F. Moore of the brightness of the sky were obtained during the progress of the eclipse. A conference was held with officials of the Argentine Government, which is likely to prove of great value in the future, in that it concerned the employment of solar-radiation measurements for weather forecasting by the Argentine meteorological service. At Calama, Chile, Dr. Abbot, in cooperation with the Smithsonian observers there, Messrs. Moore and Leonard Abbot, devised a new method of reducing solar radiation observations, so as to determine the solar constant of radiation with at least equal precision to that obtained by the older method, the advantages of the new method being (1) its independence of the variability of atmospheric transparency; (2) the time required is only one-fifth of the former period.

On Mount Wilson Mr. Aldrich continued the observations of the solar constant of radiation, and in September, 1918, made an interesting observation in cooperation with the Army Balloon School at Arcadia, Calif., on the measurement of the reflection of sun and sky radiation from layers of fog, which led him to conclude that a great horizontal fog bank reflects to space 78 per cent of the radiation of the sun falling upon it.

The preparation of Volume IV of the Annals of the Astrophysical Observatory has been in the hands of Dr. Abbot since February; it includes the results of measurements from the year 1913. Mr. Fowle has continued the work of revising the Smithsonian Physical Tables, in which he has received valuable aid from the various scientific departments of the Government and from individuals in colleges and industrial corporations.

INTERNATIONAL CATALOGUE OF SCIENTIFIC LITERATURE.

The United States Regional Bureau of the Catalogue, supported by congressional appropriation under the direction of the Smithsonian Institution, undertakes to list and index all scientific articles appearing in the United States each year. These titles are forwarded to the Central Bureau in London, where they are incorporated with the lists from all other countries in a comprehensive catalogue of the year's scientific work of the world. The war and the chaotic conditions in Europe since the war, have greatly hampered the work of the catalogue and it has been recognized for several years that a general reorganization will be necessary when conditions become more settled.

The Central Bureau has published during the year 8 volumes of the Thirteenth Annual Issue, completing that issue, and 12 of the 17 volumes of the Fourteenth Issue have appeared. The United States Bureau has continued to gather and index the scientific titles in this country, and in some of the sciences, notably zoology, the titles have been classified far in advance of the published volumes.

It has been recently announced by the Royal Society of London, the principal sponsor of the catalogue since its inception, that after the completion of the Fourteenth Annual Issue a new financial arrangement will be necessary in order to continue the work, and scientific establishments and academies throughout the world have been asked to offer suggestions as to the best method of accomplishing this end.

NECROLOGY.

I may here express for myself and on behalf of the staff of the Institution and the National Museum the deep sense of loss caused by the death during the year of Mr. Richard Rathbun, assistant secretary in charge of the National Museum, and Mr. A. Howard Clark, editor of the Smithsonian Institution. These two men, through long connection with the Institution, contributed much to its development and their passing leaves a deep feeling of personal loss among their associates.

RICHARD RATHBUN.

Richard Rathbun, assistant secretary of the Smithsonian Institution, was born in Buffalo, N. Y., January 25, 1852, and died July 16, 1918. He received his education at Cornell University, specializing in geology and paleontology. Here he was associated with Charles Fred Hartt, professor of geology, who assigned to Mr. Rathbun the task of working up for publication a collection of fossils from Brazil, which resulted in the publication of Mr. Rathbun's first paper on the "Devonian Brachiopoda of Erere, of the Province of Para, Brazil." During this work he had occasion to visit the Museum of Comparative Zoology at Cambridge, where the environment proved so congenial that he remained here for two years. During the summer months he served as a volunteer assistant under Spencer F. Baird in marine explorations on the New England coast. Through his association with Prof. Baird his connection with the Smithsonian Institution began.

In 1875 he was appointed geologist to the Geological Commission of Brazil, and for the following three years he studied the geological features of that country. On returning to the United States he was appointed a scientific assistant in the United States Fish Commission, in which service he remained until 1896.

During this period several papers from his pen appeared in "The Fisheries and the Fish Industry of the United States." During these years also he was involved in the fur seal investigation. The most important international commission to the Fur Seal Islands was the one sent out in 1896, and Mr. Rathbun was named chief advisor to Mr. Hamlin in immediate charge of the case.

In 1896 Mr. Rathbun came to the Smithsonian Institution and at the beginning of 1897 took up the duties as assistant in charge of office and exchanges, later being named assistant secretary. The following year, holding this same title, he was given charge of the National Museum, which position he held until his death.

One of the most important events during his administration of the Museum was the appropriation for and the construction of the new Natural History Building, in which he took a deep interest, and for which he was in large part responsible. He also undertook the development of the National Gallery of Art, a feature of the Smithsonian which is mentioned first in the act creating the Institution, but which had remained dormant for lack of adequate facilities.

Mr. Rathbun was a member of many scientific societies, including several foreign connections. His bibliography contains nearly 100 titles, including the numerous papers written during his connection with the Fish Commission, and his official reports as administrator of the National Museum.

ALONZO HOWARD CLARK.

Alonzo Howard Clark, editor of the Smithsonian Institution, was born in Boston April 13, 1850, and was educated at Wesleyan University, receiving an honorary degree of M. A. in 1906. Mr. Clark's first connection with the Government service was in 1879, when he was put in charge of the United States Fish Commission Station in Gloucester, Mass. In 1881 he was made curator of the division of history of the United States National Museum, and later editor of the Smithsonian Institution, which position he held until his death on December 31, 1918. Mr. Clark was also affiliated with a number of patriotic and historical societies, being secretary and registrar general of the Sons of the American Revolution, and an officer of the Society of Mayflower Descendants and of the Society of Colonial Wars. Matters of patriotic and historical interest were Mr. Clark's chief delight, and it was through his efforts that were begun the present great historical collections in the Museum. He was especially fitted for his position as curator of this division through his wide experience in historical and genealogical work and his many connections with organizations of that nature. Mr. Clark also held a prominent place in the activities of the American Historical Association, being secretary of this organization from 1889 to 1908, and curator from 1889 until the time of his death.

APPENDIX 1.

REPORT ON THE UNITED STATES NATIONAL MUSEUM.

Sir: It is with profound sorrow that I record the death at his ome in this city on July 16, 1918, of Richard Rathbun, assistant ecretary of the Smithsonian Institution since 1897, and, as such, in harge of the United States National Museum since 1898.

Out of respect to his memory the flags on the buildings of the Institution were carried at half-mast until after the interment of is remains in Rock Creek Cemetery on July 18. Business was suspended in the offices and the public exhibition halls were closed on he day of his funeral.

This is not the place to give an adequate review of the work of Mr. Rathbun as a man of science, or to recall his contributions to he upbuilding of the institution with which he was so long connected. I may be permitted, however, to express here my sense of ereavement in the passing of a man whose friendship and personal nd official confidence I was permitted to enjoy.

During Mr. Rathbun's disability, and after his decease, the administration of the Museum devolved upon me as next in authority.

On November 1, 1918, the position of assistant secretary of the Smithsonian Institution in charge of the United States National Museum was discontinued, and I, as directed by you, assumed charge f the administrative affairs of the Museum, with the title of administrative assistant to the secretary. In addition to the general luties of the above assignment, I was designated director of arts nd industries.

Introduction.—The scope of the National Museum embraces many ubjects, which may be classed under the following headings:

1. Natural history, comprising zoology, botany, geology, mineralgy, paleontology, physical anthropology, ethnology, and archeology.
2. Applied science and art (Arts and Industries).
3. The fine arts (National Gallery of Art).
4. American history.

At the capitals of the principal countries abroad there are generlly several separate Government museums for these various classes, otably in London and Paris, resulting from the independent origin f the different collections. In London, for example, the subjects ombined in the United States National Museum are distributed between two sections of the British Museum (Bloomsbury and South

Kensington), the Victoria and Albert Museum, the Science Museum, the Museum of Practical Geology, Bethnal Green Museum, the Wallace Collection, the several national galleries of art, and others. In Washington, on the contrary and very fortunately, the entire museum scheme has, by law, been essentially combined under one administration, which not only insures greater economy in management, but permits of a more logical classification and arrangement, the elimination of duplication, and a consequent reduction in the relative amount of space required.

The national collections of the United States are not yet to be compared as a whole with those of certain European countries, though in natural history they are probably not surpassed there. In respect to the fine arts, the Freer collection comprises the most important representation of oriental art in the world. However, in the fine arts generally and in the useful or industrial arts the National Museum has a great task before it, possible of accomplishment only when requisite facilities are supplied.

Steps were taken during the year looking to the more definite organization of the department of arts and industries. Elaborate classifications have been proposed from time to time, but none of these have been strictly followed in the arrangement of the collections, due mainly to the limitation of space. Work is being chiefly centered at present on those subdivisions which are most prominent in relation to current industrial affairs, but there are other subdivisions with important collections which are not represented by experts on the staff on account of lack of funds for their employment. As at present constituted the Department of Arts and Industries may be considered to consist of the Division of Mineral Technology, the Division of Textiles, the Section of Wood Technology, the Section of Foods, the Division of Medicine, and the Division of Mechanical Technology.

War activities.—In the last report the action of the Board of Regents of the Institution at the request of the President of the United States in closing the natural history building to the public on July 16, 1918, was noted, enabling the Museum to furnish the Bureau of War Risk Insurance of the Treasury Department with 138,600 square feet of space for office purposes on the ground and the two exhibition floors. This was done with the understanding that the Museum would be vacated upon the completion of the building then being erected for the bureau at the corner of Vermont Avenue and H Street, and that the Museum space would be turned back to the Museum authorities in the same condition in which it was received by the bureau. Late in March the bureau moved to its own structure, but its funds were then so depleted that it was unable to carry ut the agreement as to renovating the building. It was therefore nfortunately necessary to reopen the natural history building with- ut making the needed repairs, the first floor being opened to visitors n April 11 and the second floor on April 22.

Advantage was taken of the closing of the exhibition halls to give dditional attention to classifying, arranging, labeling, and other- ise putting in shape the study series in the various departments. n the department of geology this also afforded opportunity to thor- ughly clean and to some extent rearrange the exhibition series, so at when reopened to visitors the halls were more interesting than ver.

From the beginning of the fiscal year until the signing of the rmistice on November 11, members of the Museum staff in all depart- ents continued along the same general lines as last year to render rvice to the various governmental agencies more directly engaged ı prosecuting America's part in the great conflict. Much valuable ssistance was thus given, and the cooperation of the Museum in this ork has resulted in bringing it into even closer relationship with the ecutive departments with beneficial results.

War collections.—Early in the fiscal year, in cooperation with the ar and Navy Departments, the Museum undertook the assembling d installation of a collection of materials relating to the late war, hich will probably form one of the most important collections ever dertaken by it, and may, ultimately, need a separate building. It proposed to perpetuate the part taken by the United States in the orld War by preserving and exhibiting objects graphically illus- ating the military, naval, and aerial activities, not only of our own de of the conflict but of our opponents as well.

The value of such a collection can not be overestimated from the pular or scientific standpoint, not only forming a fitting and serveable supplement to the written and printed records relating the history of the war, but constituting a most notable memorial to e patriotic forces represented by the individuals who have con- ibuted to the preservation of civilization. It will be of the highest lue for historical and scientific research.

The scope of this exhibit includes not only the general military uipment, such as tanks, field and machine guns, and other objects ed by military organizations, naval equipment, including models f ships, naval guns, docks, yards, etc., airplanes, battle planes, but cessories of all kinds; individual military and naval equipment of e various branches of the service, such as clothing, arms, and other raphernalia, military and naval decorations and medals, commemo- tive medals of notable events, mementos, trophies, pictures, paintings, photographs, maps, books, pamphlets, manuscripts, and other objects of the same character relating to the progress of the war.

As the natural history building was closed and every available foot of space in it assigned to the Treasury Department, it became necessary to install the material received during the year for the war collections in the arts and industries building, and to place the large and heavy objects in the open to the west of this building. At the close of the year material for the war collections was coming in steadily, and it had become necessary also to assign to this subject all of the central portion of the ground story and the rotunda of the natural history building—space usually reserved for special exhibitions.

The Museum is particularly fortunate in having a very excellent series of objects showing the development of the airplane, beginning with the Langley models, which have been in its possession for a number of years, and the first Government-owned aeroplane of the world purchased by the United States from Wright Brothers in 1909. Through the director of military aeronautics, Bureau of Aircraft Production, two types of planes used by the French at the front in 1917 were received during the past year, and a Curtiss training plane, such as used at all the training fields in the United States, and the first battle plane constructed in this country for the United States Government—the DH-4, made by the Dayton-Wright Airplane Co. in 1917. This plane has flown over 100,000 miles and been in the air over 1,000 hours.

Through arrangement with the Army and Navy the Museum is planning to exhibit examples of every plane, engine, radio apparatus, and other accessory in production in the United States at the time of the armistice, and has secured for this exhibit the temporary metal structure erected on the Smithsonian grounds in 1917 by the War Department for the use of the Air Service.

Immediate needs of the Museum.—As pointed out in the report of three years ago, the pressing needs of the Museum are those for additional space for the accommodation of collections and for increase in the scientific and technical staff. It is clearly manifest that these needs must be met if the institution, with its numerous departments, is to keep reasonable pace with the development of the country as a whole. The space congestion especially becomes more pronounced and embarrassing with each passing day.

The natural history collections and the laboratories connected therewith require for their reasonable accommodation and administration the entire natural history building, a structure erected especially for this particular purpose. To-day, however, large areas in the building are assigned—and that from necessity—to the rapidly growing collections of the National Gallery of Art, and in larger measure even to the great accumulations of historical material relating to the late war which are just now demanding adequate attention. The older building, designed to accommodate the nationally important department of arts and industries, although not adequate in space to serve this purpose, is from absolute necessity half filled with a great body of unrelated exhibits, representing history, anthropology, and art.

The National Gallery of Art, now for the first time taking an enviable place among the galleries of the country, is crowded into the natural history building without possibility of expansion, and many liberally inclined collectors of art works who seek a permanent home for their treasures, and who may be favorably disposed toward Washington, are necessarily met with the statement that additional collections, if acquired, must go into storage. These possible benefactors of the national collection are thus turned to other institutions or to the auction room. The Nation is thus deprived of the possibility of building up, even by gift and bequest, collections of art, such as are highly prized and fully provided for by civilized nations generally. The sooner a building devoted to the fine arts, including all departments, is provided the more quickly will the American people find themselves in the forefront in all that characterizes the highest level of civilization.

American history, one of the most essential and vital of the departments of museum activity, is not better provided for than art. There is no provision for it save in the present overcrowded buildings. A building of an order commensurate with a great national purpose is an absolute essential, and its erection should be provided for with the least possible delay.

COLLECTIONS.

The total number of specimens acquired during the year was approximately 526,845. Received in 1,198 separate accessions, they were classified and assigned as follows: Department of anthropology, 12,333; zoology, 442,383; botany, 40,357; geology and mineralogy, 4,750; paleontology, 26,050; textiles, woods, medicines, foods, and other miscellaneous animal and vegetable products, 884; mineral technology, 62; and National Gallery of Art, 26. As loans for exhibition, 3,096 articles were also obtained, mainly for the divisions of history and American archeology and the gallery of art.

Material to the extent of 539 lots was received for special examination and report.

During the year the Museum made its first purchases from the Frances Lea Chamberlain funds, adding to the Isaac Lea collection of gems and to the Isaac Lea collection of mollusks, respectively. Through the generosity of Mr. B. H. Swales, a member of the staff, a small fund which has been given the donor's name was established during the year for the purchase of additions to the collection of birds.

The council of the National Academy of Design inaugurated purchases from the Henry Ward Ranger fund by acquiring a landscape by Bruce Crane entitled "December Uplands." Under the conditions prescribed by the will of Mr. Ranger this painting was assigned to the Syracuse Museum of Art and can be reclaimed by the National Gallery of Art at any time during the five-year period beginning 10 years after the artist's death.

Anthropology.—The additions to the historical collections during the past year have been exceptionally large and are especially interesting on account of the fact that so many of them relate to the recent war with Germany. They also include, however, many objects of note connected with the history of the United States prior to that momentous conflict. Of special note in connection with the collection received relating to the war are many mementos of persons and events, battle-field trophies, military and naval uniforms, insignia, and field equipment. These include the Combined Order of Battle Map corrected up to November 11, 1918, with its accessories, as used by Gen. Pershing and his staff at Chaumont, France, throughout the progress of the American military movements, showing locations of all United States divisions and exact location at the signing of the armistice, with the same information as to armies of the Allies and enemies, besides a large amount of other information; a most interesting collection of German military paraphernalia captured during the various engagements in which the American troops participated and assembled in France by Maj. Gen. H. L. Rogers, United States Army, while serving as chief quartermaster of the American Expeditionary Forces; two French military airplanes used on the western front and the first battle plane built in America; collections of infantry, artillery, cavalry, air service, and chemical warfare equipment of the type used during the war; a practically complete series of the uniforms, insignia, decorations, and medals of the Army and Navy; a notable collection of relics of Lieut. Benjamin Stuart Walcott, United States Army, who entered the French air service as a member of the Lafayette Flying Corps, was killed in aerial combat, and fell within the German lines December 12, 1917; also loan collections of uniforms worn by French officers. The war collections already received will be supplemented by others until the Museum possesses a complete representation of the vast amount of paraphernalia required in the prosecution of a modern war, including representative series of objects actually used during the recent conflict by the United States, the Allies, and the enemy countries.

The most notable collection not connected with the war received by the division of history during the past year consists of a very large and interesting series of costumes and accessories worn by the late Richard Mansfield in his extensive repertoire of historic characters, presented by Mrs. Mansfield. Many other historical relics were received, among them the gold medal awarded by act of Congress to Capt. Thomas Truxtun, United States Navy, in recognition of the defeat of the French ship *Vengeance*, February 1, 1800, lent by Mr. Thomas Truxtun Houston; a silver-mounted telescope owned by Thomas Jefferson, lent by Brig. Gen. Jefferson Randolph Kean, Medical Corps, United States Army; and a jeweled sword presented to Maj. Gen. John R. Brooke, United States Army, by American and Cuban friends in 1899.

The operations of the curators of the divisions of ethnology and archeology in Arizona have added considerably to the collections in archeology, and Dr. W. L. Abbott has supplemented the material generously contributed by him in previous years from Celebes with a large series of costumes, ornaments, and implements collected by Mr. H. C. Raven. Especially interesting are the decorative designs on the bark cloth used for costumes on these islands.

In physical anthropology very important accessions from the ancient pueblo region were received through Mr. F. W. Hodge, as a gift from the Museum of the American Indian, and as a gift from Dr. Edwin Kirk valuable crania and other physical remains from the territory occupied by the Haida and Tlingit tribes of Alaska.

Biology.—The number of specimens received during the year by the department of biology, totaling about 482,740, vastly exceeded the number accessioned last year. This great increase was chiefly due to the incorporation of the unrivaled collection of Antillean land mollusks, aggregating approximately 400,000 specimens, which was donated by Mr. John B. Henderson, a regent of the Smithsonian Institution. It is one of the most complete and extensive collections of its kind in existence not only because it contains nearly all the known West Indian species but because of the large number of types and authentic specimens which it includes. Among the many other important collections received, it may be well to mention the final installment of Mr. Raven's Celebes collections, which we owe to Dr. W. L. Abbott's generosity, and the interesting material from the Collins-Garner Expedition to the French Congo, containing as it does, besides a large number of birds and smaller mammals, three gorillas and several chimpanzees. Secretary Walcott, during his explorations in British Columbia, collected several large mammals for the Museum, including a mule deer, Rocky Mountain goat, and Rocky Mountain sheep, which made a valuable addition to our collections.

Among the additions to the National Herbarium may be particularly mentioned about 12,000 plants, chiefly from Mexico, donated by Brother G. Arsène and representing the result of eight years' botanical collecting by himself and associates among the Christian Brothers. The collection of Philippine plants was greatly increased by the addition of two lots, aggregating more than 9,600 specimens, one received in exchange from the Bureau of Science, Manila, the other acquired by purchase. The South American series was also augmented considerably by the donation of 1,761 Venezuelan plants by Dr. H. Pittier and 1,077 specimens exchanged with the Museu Goeldi in Para, Brazil, besides the Museum's share of about 2,000 specimens from the Ecuadorean Andes collected by Dr. J. N. Rose on an expedition undertaken jointly with the New York Botanical Garden and the Gray Herbarium; while exchanges with the last-mentioned institution added approximately 1,450 more South American plants.

The exhibition collections were closed most of the year on account of the space having been turned over to the Bureau of War Risk Insurance. However, toward the end of the year the halls on the first floor, containing mostly the mammals and birds, including the great biological groups, were reoccupied by the Museum and opened to the public, after certain additions and improvements in the installation had been made.

Geology.—The additions to the collections in this department during the year were but 135 lots, aggregating an approximate total of nearly 31,000 specimens. This number, although somewhat less than that of the preceding year, is, in part, compensated for by the unusual value of sundry individual specimens. Among these may be mentioned examples of tungsten minerals both from domestic and foreign sources, including a magnificent specimen of scheelite presented by Dr. J. Morgan Clements, of New York City, and upward of 16.5 kilograms of the extraordinary meteorite which fell at Cumberland Falls, in Whitley County, Ky., on the 9th of April, 1919.

The availability of the Frances Lea Chamberlain fund has enabled the department to begin once more a systematic building up of the Isaac Lea gem collection. A 7-gram kunzite, a 16-gram black opal from Nevada, and 5 beautiful examples of Australian opals of a variety heretofore unrepresented in the collections are among the more important additions.

The Middle Cambrian collections obtained by Secretary Walcott from Burgess Pass in British Columbia number nearly 7,000 individual specimens, and form an addition of unusual value. The same is true of a collection including both fossil invertebrates and plants, mainly from Carboniferous and Silurian rocks of Indiana, and especially rich in beautifully preserved crinoids. This collection, comprising not less than 10,000 specimens, was a gift of Mr. Alva Schaefer, of Brazil, Ind.

Excellent exhibition materials in the line of vertebrate fossils, including part of a skeleton with a skull of the curious amphibial *Diplocaulus copei* from the Permian of Texas; a skull of *Monoclonius*; a skull, partial skeleton, and two hind paddles of *Tylosaurus*; and an articulated series of caudal vertebræ of *Platycarpus* are among the more important accessions. Mention should be made of the addition to the exhibition series of the mounted skeleton of *Dimetrodon gigas*, which was secured some few years ago. This forms the most complete restoration of this extraordinary animal that has thus far been secured by any museum in the world.

Museum work, as in other departments, suffered through interruptions, including the closing of the exhibition halls, incidental to the war, the head curator himself being engaged a part of the time in procuring for the National Research Council important materials needed in newly devised apparatus. Continual demands were made upon the department throughout the entire period of the war for materials for experimental purposes, and it is felt that the department fully justified itself in its capacity for supplying that which was needed.

Advantage was taken of the relief from all exhibition work caused by the closing of the halls, to complete the records and attend to other work such as had heretofore suffered more or less neglect through pressure of other duties.

Incidental mention may be made of the preparation of 100 lots in sets comprising 21 specimens each, illustrating the secular decay of rocks and intended primarily for distribution to the agricultural schools. Considerable progress was also made in the preparation of 100 sets of upward of 80 specimens each of ores and minerals which are intended for distribution as occasion may demand. This is a work which is ordinarily done at odd moments, as no funds are directly available for the purpose.

Textiles.—To the collections under the charge of the curator of textiles, which, besides textiles, embrace wood technology, medicine, food, and animal and vegetable products, the most important addition was the collection received by transfer from the Office of the Surgeon General of the War Department, consisting of apparatus, hospital appliances, and field equipment used by the medical, dental, and sanitary corps in the war with Germany, including examples of all kinds of equipment of a thousand-bed hospital overseas. At the end of the year this was being made ready for the public in connection with the war collections on the ground floor of the natural history building.

Among the gifts were medicinal plants, pharmaceutical products, pile fabrics, novelty dress fabrics, leather cloth, and other waterproof textiles extensively used during the war, knitting and crocheting yarns with examples of pattern stitches, an extensive collection illustrating the production, classification, and conservation of foods, with many such from the Department of Agriculture and the United States Food Administration, and an exhibit illustrative of neglected sources of supply of fats and oils for food purposes.

In making the food exhibits as useful as possible a cooperative arrangement was entered into with the States Relations Service of the Department of Agriculture whereby regular demonstrations on the value, use, preparation, and conservation of foods were given at the Museum by experts of the department. A large room in the arts and industries building was fitted up as a demonstration kitchen and space provided for displaying foods, models, and household equipment. This work soon broadened into a household consultation center, with lectures and demonstrations covering a wide range of subjects. There were lectures on the Business of the household; Food for the family on $2 per day; Direct marketing; What becomes of the consumer's dollar; What to give your children to eat; Milk, its nutrition and use; Meat substitutes; Housekeeper's use of market schedules; and Influence of weave structure upon the durability of fabrics. The demonstrations included labor-saving appliances for the kitchen; the fireless cooker; the pressure cooker, the electric washing machine; preserving eggs; cooking dinner in 30 minutes; the one-dish meal; invalid cookery; dried milk powder; Christmas sweets; sugarless candies; and fruit juices in summer drinks. By classes and demonstrations for housekeepers in the mornings and afternoons and special classes for war workers at 5 p. m., over 2,100 persons were reached during the year.

Mineral technology.—In mineral technology the customary work of the division was shelved in favor of special activities with a more direct bearing on the national emergency. As the war progressed the call for specialization on the part of its technical staff increased. While the country was still actively involved on a basis of war scarcely a day passed without bringing calls from some governmental agency for assistance with reference to one or another industrial issue up for consideration on an emergency rating, the questions ranging from determining a fair price for mica to determining the likelihood of a paralyzing petroleum shortage. As the year advanced, however, two absorbing lines of special investigation developed to such a degree that during the latter half of the year they largely engrossed the attention of the staff. Their general nature may be gathered from the titles under which the results were issued. One, "A Report on the Political and Commercial Control of the Nitrogen Resources of the World," represents an effort to unravel the complexities of the nitrogen situation left behind in the passing of the war. The other, "The Energy Resources, a Field for Reconstruction," coordinates and summarizes the work of several years.

THE NATIONAL GALLERY OF ART.

The National Gallery of Art is fortunate in the acquirement of art works of exceptional importance during the year. Among these the most noteworthy is a gift by Mr. Ralph Cross Johnson of 24 paintings, which comprises selections from the brushes of 19 of Europe's foremost masters. The Gallery is thus more fully assured of a worthy position among the galleries of the Nation. The extension of the Gallery's activities to wider fields than heretofore is marked by the acquirement by gift of an installment of a rich collection of art works of European origin from Rev. A. D. Pell, of New York.

Notwithstanding the prevailing labor conditions much progress was made during the year on the building being erected by the Institution at the expense of Mr. Charles L. Freer, on the southwestern corner of the Smithsonian reservation, to house the Freer collections of American and oriental art. The building was entirely inclosed at the end of the year, the exterior granite and marble walls and the roofs being completed. Work on the interior is now progressing satisfactorily, and it is expected that the structure will be entirely finished this autumn.

MEETINGS.

Shortly after the armistice was declared and as soon as the auditorium, which had been vacated late in November, could be repainted and the chairs replaced, there was inaugurated a series of popular lectures, under the auspices of the Institution, on alternate Saturday afternoons, between the hours of 4.45 and 5.30, commencing January 18, 1919. The lecturers and subjects are noted in the report of the secretary.

The meeting facilities afforded by the auditorium and committee rooms were also availed of, as follows:

By the United States Employment Bureau of the Department of Labor, for lectures by Dr. Meeker on the gathering and interpretation of statistics, and by Dr. Prosser on training of the handicapped; by the Children's Bureau for a conference on child's welfare, with an illustrated lecture; by the Ordnance Bureau of the War Department for an illustrated lecture by Lieut. Col. G. M. Barnes on battle scenes in the World War; by the Artillery Division of the Army for an illustrated lecture on the method in camouflaging used by that division during the war; by the Public Health Service of the Treasury Department for a moving picture, "Fit to win," before the faculties and students of the departments of medicine and dentistry of the Georgetown University, with remarks by Asst. Surg. Gen. Pierce and by Dr. George E. Kober and Dr. Bruce L. Taylor; by various divisions of the Bureau of War Risk Insurance on numerous occasions for various purposes; by the American Society of Mammalogists; by the Wild Flower Preservation Society; by the Biological Society of Washington; by the Louisiana Society of Washington, with an illustrated lecture by Hon. M. F. Alexander, State commissioner of conservation, on the work accomplished by the Alabama Conservation Commission during the past 10 years; by the National Women's Trade Union League for a lecture by Miss Margaret Bondfield, of England, on the new spirit of British labor; by the Minimum Wage Board of the District of Columbia for a conference; by the District of Columbia Chapter of the Sigma Xi for its annual meeting and an illustrated lecture by Maj. R. M. Yerkes on the relationship of Army tests to education and vocational guidance; and by the scientific and technical Federal employees for the purpose of forming an organization with a view to joining the Federal Employees Union.

The main hall, range, and chapel of the Smithsonian building proving inadequate for the annual meeting of the National Academy of Sciences in April, the sessions of the last two days were transferred to the Museum auditorium. The auditorium was also used two days for a conference on the American merchant marine, the Hon. Joseph E. Ransdell presiding.

MISCELLANEOUS.

The distribution of duplicates for educational purposes, chiefly to schools and colleges, aggregated 3,441 specimens, while over 5,000 more were used in procuring additions to the collections through exchanges. Material sent for study to collaborators of the Museum and other specialists amounted to 19,851 specimens, mainly zoological.

During the approximate three months that the natural history building was open the attendance of visitors was 94,240 for week days and 38,619 for Sundays, an average of 1,149 for week days and 2,758 for Sundays. From November 10 to April 6 the opening of the arts and industries building was extended to include Sundays as well as week days, the attendance there for the year being 225,927 on week days and 40,605 on Sundays, a daily average of 721 for the former and 1,845 for the latter. At the Smithsonian building the total attendance was 101,504, with a daily average of 324 persons.

The publications of the year consisted of two annual reports, those for 1917 and 1918, two volumes of proceedings, four bulletins, and 71 separate papers. The total distributions of Museum publications during the year aggregated 118,332 copies.

The Museum library was increased by 2,172 volumes and 2,614 pamphlets and unbound papers, mainly procured by gift or exchange. Among the more important acquisitions was a set of catalogues of the art collections of J. Pierpont Morgan, presented by J. Pierpont Morgan, jr., the valuable library of Dr. Richard Rathbun, relating to the museums of the world and to natural history subjects, the gift of his heirs, and the 12 volumes of its Humanistic Series, donated by the University of Michigan. The library now contains 54,685 volumes and 87,109 pamphlets and unbound papers.

Respectfully submitted.

W. DE C. RAVENEL,
Administrative Assistant to the Secretary
in charge U. S. National Museum.

Dr. CHARLES D. WALCOTT,
Secretary of the Smithsonian Institution.
AUGUST 25, 1919.

APPENDIX 2.

REPORT ON THE BUREAU OF AMERICAN ETHNOLOGY.

SIR: In response to your request I have the honor to submit the following report on the researches and other operations of the Bureau of American Ethnology during the fiscal year ended June 30, 1919, conducted in accordance with the act of Congress approved July 1, 1918, making provision for sundry civil expenses of the Government, and following a plan submitted by the chief and approved by you as Secretary of the Smithsonian Institution. The act referred to contains the following item:

> American ethnology: For continuing ethnological researches among the American Indians and the natives of Hawaii, including the excavation and preservation of archæologic remains, under the direction of the Smithsonian Institution, including necessary employees and the purchase of necessary books and periodicals, $42,000.

The ethnological and archeological researches of the staff which are considered in the following report being by law restricted to the American Indians thus from necessity are more or less limited in scope, but notwithstanding this limitation and the intensive work that has been done in the past there is no indication that this field has been sufficiently cultivated or is approaching exhaustion. It is evident that aboriginal manners and customs are rapidly disappearing, but notwithstanding that disappearance much remains unknown, and there has come a more urgent necessity to preserve for posterity by adequate record the many survivals before they disappear forever.

The remnants of languages once spoken by large populations have dwindled to survivals spoken by one or more centenarians, and when they die these tongues, if not recorded, will be lost forever. Such a fate nearly happened with an Indian tongue in California last year on account of a contagious disease, but fortunately, through the field work of one of our staff, it was rescued before its extinction.

The continued study of the material culture of the Indians has a practical economic value. Certain food plants, like maize, and fibers, like henequen, have already been adopted from our aborigines, and there are others of vast economic value which await investigation. Ethnological studies of our Indians along these lines are being made by the members of the staff.

Another instructive line of work the past year relates to the history of the Indians both before and after the advent of the Europeans.

Such studies tend to a broader appreciation of racial character and have special value when we reflect how rapidly the Indian population is merging into American life. The excavation and repair of prehistoric monuments in our Southwest is enlarging our knowledge of history as well as attracting more and more tourists and replacing threadbare prejudices with saner ideas of Indian possibilities in many lines.

The logical results of the events of the last years appear in the calls for information made on the staff for accurate knowledge of other races besides the American Indian. It needs no prophet to predict that the future will demand an extension of the bureau work to other races. The calls for ethnological information on the Indian during the past year have been many and varied and considerable time of the ethnologists has been taken up in answering the many requests of this nature that are made. The chief has given much time to administration and routine work.

In addition to administrative duties the chief has been able to devote considerable time to research work in the field and has prepared for publication several scientific articles, the largest of which will soon be published as Bulletin No. 70. These field researches are in accordance with the above-mentioned act of Congress, which includes the excavation and preservation of archeological remains. In September he took the field, continuing his explorations of the castles and towers of the McElmo and tributary canyons in southwestern Colorado, extending his studies westward into southeastern Utah as far as Montezuma Canyon. The object was to determine the western horizon of the area of the pure type of pueblos and cliff dwellings, and to investigate the remains of antecedent peoples from which it sprung in order to obtain data bearing on the question of the origin of the San Juan drainage culture. The country traveled through is especially rich in prehistoric towers and castellated buildings, but contains also many clusters of mounds formed by fallen walls of large communal buildings, many of which were wholly or partially unknown to science. The work was largely a reconnoissance and no extensive excavations or repair work was attempted. Special attention was paid to the structure and probable use of towers which are combined with cliff houses like Cliff Palace, or great villages like those of the Mummy Lake and upper San Juan and its tributaries. Among the most significant new towers discovered were two found in McLean Basin, near the old Bluff City trail not far from the State line of Utah and Colorado. The McLean Basin ruin has a rectangular shape, with a round tower on one corner and one of semicircular form on the diagonally opposite angle, each 15 feet high. The building on which these towers stand must have presented a very exceptional appearance in prehistoric times before its walls had fallen. Another ruin found in a cave in Sand Canyon is instructive on account of its being the only one yet found with a single kiva of the unit type. It was probably a ceremonial cave, the room showing scanty evidence of having been inhabited.

One of the discoveries made was the recognition that the buildings on McElmo Bluff had a crude masonry characterized by stones set on edge, the walls being made of adobe and logs. The stones of one or more rooms on this site were large, indicating megalithic stone houses. All the data assembled indicate that they antedated the fine horizontal masonry of the pueblos and cliff dwellings.

While in the field the chief carried on a correspondence with Mr. Van Kleeck, of Denver, owner of the Aztec Spring Ruin, which led to that ruin being presented to the National Park Service and later accepted by the Secretary of the Interior. The presentation of this interesting ruin to the Government is important and it is to be hoped that it will later be excavated and repaired and thus present an additional attraction to tourists and an important aid to the archeologist in the interpretation of this type of southwestern ruin.

In May the chief visited Austin, Tex., and inaugurated work on the antiquities of that State, the archeology of which has been neglected. This work is now being prosecuted by Prof. J. E. Pearce, of the University of Texas, and bids fair to open up a most instructive chapter in a field of which we know comparatively little. Important discoveries have been made in the aboriginal workshops and village sites at Round Rock and near Austin, where fine flint implements are very abundant. The work will be continued into the timbered region of eastern Texas, where we find pottery related to that of Louisiana and Arkansas and evidences of a radically different prehistoric culture from that of central Texas.

Mr. James Mooney, ethnologist, at the beginning of the fiscal year was at his former field of labor among the Kiowa and associated tribes of western Oklahoma, where several months were devoted to the collection and revision of material and observations of ceremonies among the Kiowa, Comanche, Kiowa Apache, Cheyenne, Arapaho, Caddo, and Wichita in continuation of studies of their aboriginal heraldry, social and military organization, and religion.

Since his return to Washington in November he has been employed chiefly in the coordination of material obtained in the field and in the compiling of data for reply to current letters of ethnologic inquiry.

Dr. John R. Swanton, ethnologist, devoted a considerable part of his time during the past year to the collection of material from published sources for a study of the economic background of the life of the American Indians north of Mexico. This involves an examination of the sources, location, and quantity of food supplies and of new materials used in the industrial life of the various tribes—materials of wood, stone, bone, shell, etc. In this way it is hoped that a more complete understanding of the density and distribution of the prehistoric population may be reached, and the location and significance of trade routes established. A clearer idea is also sought of the shifts in population undoubtedly brought about by the introduction of corn. Without some study of the kind no proper estimate of the social and religious institutions of the people of prehistoric America is possible.

His work on the languages of the Indians of the lower Mississippi Valley has been continued, and at the end of the year it was directed particularly to the preparation of a grammatical sketch of the Natchez language from materials collected by him during the last 10 years from one of the three surviving speakers of that tongue.

In April Dr. Swanton visited Oklahoma in order to collect additional information regarding the little understood and now almost forgotten social systems of the Choctaw and Chickasaw Indians. Although small in bulk, the material obtained in the course of the investigation is valuable. It has already been incorporated into a manuscript paper on the social organization and social customs of the Indians of the Muskhogean stock. During the trip he also secured the services of an educated Chickasaw in writing texts in his native tongue, and one of these has already been received.

Before his return to Washington, Dr. Swanton visited Anadarko, where he learned that the language of the Kichai Indians is on the point of extinction, and began the collection of a vocabulary. He has made arrangements for more extended work upon this language in the fall.

He has submitted two papers for publication during the year, first a philological paper entitled "A Structural and Lexical Comparison of the Tunica, Chitimacha, and Atakapa Languages," which is being published as Bulletin 68, in which he believes he has shown the relationship of what had hitherto been classed as three independent stocks; and, second, an extended historical study of the Creek Indians and their neighbors.

Mr. J. N. B. Hewitt, ethnologist, on his return from field work, July 5, 1918, took up the final reading of the proofs of his report in the Thirty-second Annual Report of the Bureau of American Ethnology. These proofs were sent to the Printing Office November 9, 1918, and the printed report was ready for distribution May 12, 1919.

At this time he also took up the work of preparing for the press the texts, with free and interlinear translations, of an Onondaga version of the Myth of the Beginnings, the Genesis Myth of the

Iroquoian peoples, as the second part of Iroquoian Cosmology, the first part having been printed in the Twenty-first Annual Report of the bureau. The copying of the pencil text was completed, aggregating 316 typewritten pages. This includes the supplementary myth of much later date than the accompanying version of the Myth of the Beginnings. The most interesting feature of the supplementary myth is the naive description of one of the most remarkable figures developed by the cosmic thinking of Iroquoian poets. This potent figure, in whose keeping are life and the endless interchange of the seasons, is most striking in his external aspect—one side of his body being composed of living flesh and the other of crystal ice. In the longer preceding myth, to which this is supplemental, the Master of Life is an independent personage, and so also is his noted brother, the Master of Winter, the Winter God, whose body is composed of crystal ice. The Life God, or Master of Life, controlled the summer, and his brother, the Winter God, controlled the winter. So in this peculiar figure there appears the inceptive fusing together of two hitherto independent gods who were brothers because they dwelt together in space and time.

This remarkable figure is, in fact, the symbol of the absorption of the personality—the functions and activities—of the Master of Winter (the Winter God) by the Master of Life and his powerful aids, manifested in the power of the Master of Life (the Life God) to save and to protect from dissolution and death his many wards, all living things that comprise faunal and floral life. This fact emerges from the experience of the human race from year to year. This submergence of one divine personality in that of another is a process of cosmic thinking encountered in the mythic philosophy of other races. This figure, as described in this text, is worthy of intensive study by the student of comparative mythology and religion. The pencil texts of these myths aggregate 1,057 pages and the typewritten 316 pages. The tentative draft of the free translations of these texts aggregates 250 pages of typewriting. Some work was also done in supplying the first text with a literal interlinear translation. This will be ready for the press at an early date.

Mr. Hewitt also continued work on his league material, in which he completed the copying of the corrected and amended native text of the tradition of the founding of the Iroquois League, or Confederation by Deganawida, making 189 typewritten pages, and also the amended and corrected text of the Chant of the Condoling and Installation Council. detailing some of the fundamental laws of the league; this occupies 13 pages.

Upon request, Mr. Hewitt also submitted an article on the League of the Iroquois and Its Constitution for the Annual Report of the Smithsonian Institution; it occupies 30 typewritten pages.

Mr. Hewitt has also attended the meetings of the United States Geographic Board, on which he represents the Smithsonian Institution.

As custodian of manuscripts, Mr. Hewitt has charged out and received back such items as were required by collaborators.

Mr. Hewitt also spent much time and study in the preparation of matter for official replies to letters of correspondents of the bureau or to those which have been referred to the bureau from other departments of the Government.

On May 12, 1919, Mr. Hewitt left Washington on field duty. His first stop was on the Onondaga reservation, situated about 8 miles south of Syracuse, N. Y. There he was able to record in native text all of the doctrines of the great Seneca religious reformer, Skanyodaiyo ("Handsome Lake"). This is an important text, as it will serve to show just how much was original native belief and how much was added by the reformer from his impressions formed from observing the results of European intrusion. This text contains about 14,000 native terms. He also recorded the several remnant league rituals and chants which are still available on this reservation. But they are so much abbreviated and their several parts so confused and intermixed one with another that with these remains alone it would be absolutely impossible to obtain even an approximate view of their original forms and settings—a most disappointing situation for the recorder. Only the most elementary and superficial knowledge of the structure and constitution of the Iroquois League survives here.

Having completed his projected work at this reservation, Mr. Hewitt went, May 31, to the Six Nations reservation on Grand River, Ontario, Canada. Here he resumed the analysis, correction, amendation, and translation of the league texts which he had recorded in previous years. Satisfactory progress was made in this work up to the time of the close of his field assignment.

During the year Mr. Francis LaFlesche, ethnologist, devoted a part of his time to the task of assembling his notes taken at the time of his visit among the Osage people in the month of May, 1918. These notes relate to the tribal rite entitled Ga-hi′-ge O-k'o^{n}, The Rite of the Chiefs. The ritual contains 27 wi′-gi-es (recited parts), 20 of which belong to individual gentes and 7 of which are tribal.

In this ritual is embodied the story of the four stages of the development of the tribal government, including both the military and the civil forms, beginning with the chaotic state of the tribal existence.

The securing of the information relating to this rite required considerable tact, patience, and time, because the men familiar with all the details still regard the ancient rites with reverence and superstitious awe. The transcribing of the wi′-gi-es from the dictaphone records and the translation of the words from the Osage into the English language were laborious and tedious tasks. This rite will soon be entirely forgotten, as it has been abandoned now for a number of years, and the rescuing of it for preservation has been timely.

This rite, which will make the first part of the volume now being completed for publication, covers 182 typewritten pages without the illustrations, maps, and diagrams.

The office of hereditary chief has been abandoned and since 1881 has been elective.

Upon the completion of The Rite of the Chiefs, the work of arranging for publication the ritual entitled Ni′-ki Wa-tho^n, Song of the Sayings of the Ancient Men, was taken up. This ritual tells of the origin of the people of the Ho^n′-ga subdivision of the Ho^n′-ga great tribal dual division. The story of their descent from the sky to the earth and of their subsequent movements is put into wi′-gi-e form and recited at the initiatory ceremonies. Each gens has its own version of the story and has in it a proprietary right, a right that in olden times was not infringed upon by the others.

Mr. LaFlesche was fortunate in becoming acquainted with an Osage by the name of Xu-tha′-wa-to^n-i^n and of winning his friendship. This man belonged to the Tsi′-zhu Wa-no^n gens of the Tsi′-zhu great tribal dual division. Without the slightest hesitation he recited for Mr. LaFlesche the Ni′-ki Wi′-gi-e of his own gens, and he also gave with it some of the shorter wi′-gi-es that accompany certain ceremonial acts of the ritual.

These origin rituals when completed will cover more than 220 typewritten pages, to which two short wi′-gi-es of a like character, nearly ready, will be added. These pages added to those of The Rite of the Chiefs will bring the number of typewritten pages, without the illustrations, close to 430.

The Fasting Ritual, which was completed some time ago, and covers 492 pages, exclusive of the illustrations, and the two rituals above referred to, will make the first volume of a projected work on the Osage tribe.

On July 1, Dr. Truman Michelson, ethnologist, visited Tama, Iowa, and completed his field work on the grammatical analysis of the text of "The Owl Sacred Pack of the Fox Indians." On his return to Washington he worked out a practically exhaustive list of verbal stems and submitted a manuscript for publication. He also observed mortuary customs under peculiarly fortunate conditions and obtained a number of texts written in the current syllabary on mortuary customs, eschatology, etc. He restored phonetically and translated, with a few exceptions, 310 personal names. He verified a previous discovery that certain gentes have their own peculiar names or dogs and horses, and translated 127 of these names for a forthoming paper on Fox sociology. Dr. Michelson finished the correcion of Jones' Ojibwa Texts, part 2, which with part 1, previously orrected by him, will form the basis of a proposed sketch of Ojibwa grammar. During the fiscal year he also from time to time furnished data to answer official correspondence.

The beginning of the fiscal year found Mr. J. P. Harrington, ethnologist, at Taos, N. Mex., engaged in the correction and completion of his manuscript on the Tiwa language. The Taos material of the late Mrs. M. C. Stevenson, which is of considerable bulk and great value, was also checked up and made more complete, especially in its linguistic aspects. The close genetic relationship of the Tanoan dialects of New Mexico with Kiowa is remarkable, a very large number of stems and affixes having practically the same sound, while the grammar runs parallel throughout. Certain subtle and unusual phonetic hardenings occurring in these languages make it impossible to assume anything but common descent from a not very remote ancestral tongue. These discoveries open up far-reaching speculations and problems with regard to the origin of the Pueblo Indians.

In August Mr. Harrington proceeded to southern California, where he continued his studies of the Chumashan Indians, most of the time being devoted to the Ventureño, which was also the dialect most successfully studied. During the course of the work the last good informant on the language of La Purisima died. Important information was recorded on the ancient customs attending birth, marriage, and death, and some idea was gleaned of the manner of conducting primitive pre-Spanish fiestas. Data on native foods was also obtained, including detailed descriptions of the preparation of acorn and other vegetal foods in this region, information on these processes having never before been recorded. For example, in the preparation of acorns various species were employed, and also certain individual trees were noted for their preferable fruit, but the final palatableness of the acorn mush depended largely on the patience and skill of the woman who prepared it. A kind of acorn bread was also prepared by cooling the mush in small molds which were placed in running water. Certain other vegetal foods, as the pit of the islay or California wild cherry, required long and complicated preparation. As primitive beverages may be mentioned toasted chia or similar seeds stirred up with the fingers in cold water; a satisfying drink made by soaking the bark of the ash in water; blackberries crushed in water; and a drink prepared from the fruit of the manzanita. A delicious sugar was obtained from a species of reed, and the fruit of the juniper was ground into a sweet, yellowish food. Interesting snatches of information reveal the former plenitude of fish and game. Fishing paraphernalia was evidently quite highly developed, both nets and harpoons having been in use, but the whale was not hunted, although the flesh of stranded whales was eagerly made use of.

Mr. Harrington returned to Washington at the close of May and spent the following month in the preparation of manuscript material.

SPECIAL RESEARCHES.

Dr. Franz Boas, honorary philologist, has been engaged in the correction of the proof of the Thirty-fifth Annual Report. Continued correspondence with Mr. George Hunt, of Fort Rupert, Vancouver Island, has added a considerable amount of new material to the original report.

Preparatory work for the discussion of the ethnology of the Kwakiutl Indians was also continued during the present year. A chapter on place names and another one on personal names and material for maps accompanying the chapters on place names has been submitted. Thanks are due to Dr. Edward Sapir, of the Geological Survey of Canada, through whose kindness the detailed surveys of the land office of British Columbia have been utilized. Other detailed maps showing the distribution of garden beds and charts illustrating the genealogies of a number of families have been prepared.

After the unfortunate death of Mr. Haeberlin, the work on the Salish material was transferred to Miss Helen H. Roberts, who, in the course of the year, completed the study of the basketry of the Salish Indians. A considerable amount of additional information, the need for which developed during the work, was supplied by Mr. James Teit, who, at Dr. Boas's request, and following detailed questions, reported on special aspects of the decorative art of the Thompson Indians. This work has been carried on with the continued financial support of Mr. Homer E. Sargent, whose interest in ethnological work in the Northwest has already furnished most important material. During the year the work on the map accompanying the discussion of the distribution of the Salish tribes was also completed.

Work on the second part of the Handbook of American Indian Languages also progresses. The completed sketches of the Alsea language, by Dr. Leo J. Frachtenberg, and that of the Paiute, by Dr. Edward Sapir, were received by the end of the preceding fiscal year, and the editorial work on these sketches has nearly been completed. These two sketches and that of the Kutenai, which has partly been written, will complete the second volume of the Handbook.

Dr. Walter Hough, curator of ethnology, was detailed to continue archeological work in the White Mountain Apache Reserve, Arizona, on ruins reconnoitered in 1918. Dr. Hough was aided in his field work by Mr. and Mrs. S. W. Jacques, of Lakeside, by whom his work was much facilitated. Field work was especially devoted to the ruins called by the Apaches Nustegge Toega, " Grasshopper Spring," and clusters of sites in the near vicinity which form a very large group, indicating extensive intermingling of cultures. The main cluster stands in the open green valley and consists of two great heaps of stones covered with squaw bush, walnut, juniper, and pine, with occasional fragments of projecting walls, evidences of two large compact pueblos separated by Salt River draw. The west village (four or five stories high) has a court near the south end, 90 by 140 feet, connected with a small plaza, and covers more than an acre. The east village is more than half an acre in area. North of the west village is a plaza 300 feet long, flanked in part on the west by an isolated clan house of 18 rooms. The six ruins in the cluster that may be regarded as clan houses differ in size and arrangement of rooms and in general show considerable skill in construction. A third form of building west of the large village is indicated by large rectangular areas outlined with building stones scattered over the level ground. The foundations are of four or five courses, but never were buried more than 18 inches, indicating that they did not support a heavy superstructure. Two lenticular rubbish heaps, measuring 60 by 72 feet and 4 feet high, lie on the meadow 100 yards south of the walls of the large village. A feature of Pueblo masonry discovered here was retaining walls of quite large stone set on bedrock, apparently intended to counter lateral thrust of heavy walls. Several rooms were cleared out by Apache laborers under Dr. Hough's direction and many artifacts and some human skeletal material were obtained.

Mr. Neil M. Judd, curator of American archeology, prosecuted archeological field work in certain caves in Cottonwood Canyon which he had visited in 1915. He successfully investigated five prehistoric ruins in Cottonwood Canyon caves during the two weeks in which work was possible. Walls of houses were found to be built entirely of adobe, as well as the customary structures made of stone bound with clay mortar. Associated with these dwellings were rooms of still another type—houses whose walls consisted of vertical posts set at intervals and joined by masses of adobe. It will be noted that all three types closely resemble those structures exposed during the excavation of mounds in central Utah and previously reported.[1]

The dwellings in " Kiva Cave " form the best preserved cliff village yet visited by Mr. Judd north and west of the Rio Colorado. Two of the four houses visited are practically intact; the ceremonial chamber, from which the ruin takes its name, being in excellent condition, although constantly exposed to the snow and summer rains. After excavating this cave considerable restoration was attempted in order that walls weakened by action of the elements and by thoughtless visitors might be preserved for years to come. At the suggestion of Mr. B. A. Riggs a fence was constructed around the house to keep cattle from that portion of the cave.

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[1] Smithsonian Misc. Coll., vol. 66, No. 3, pp. 64-69; No. 17, pp. 103–108; vol. 68, No. 12, p. 83.

Buildings with masonry walls were also found in "Ruin Cave," but in this case were built directly upon remains of other structures of an entirely different character. The latter are usually circular and their walls were formed of posts to which horizontal willows were bound at intervals of 7 or 8 inches; adobe mud was pressed between these posts and over the willows, but additional and larger supports were required to take the great weight of the roof. Although these structures lie generally beneath the stone houses, it is evident that both types were built by the same people and the occupancy of the cave was at no time long interrupted.

Prehistoric house remains were also found in each of the other three caves excavated, but they consisted chiefly of small rooms with walls constructed entirely of adobe. Still other ruins were discovered high up under the ledges that lie on either side of Cottonwood Canyon, but unusual conditions prevented examination of these.

Upright sandstone slabs invariably form the inner base of the walls in ruins throughout the region under consideration, a fact which connects them with the so-called "slab-house" people of the San Juan drainage. Whether there is, in fact, any justification for this term remains yet to be proven, but the cultural relationship of the prehistoric peoples in southwestern Utah with those south of the Rio Colorado is at last definitely established.

The bureau purchased from Miss Frances Densmore papers on "Chippewa Remedies and General Customs" and "Chippewa Art." The latter article has 164 pages, with 42 pages of old Chippewa designs and numerous photographs pertaining to industries, medicinal plants, customs, and toys of children, games, processes of weaving, tanning, and other industries. The lists of plants were identified by Mr. Paul C. Standley.

Miss Densmore likewise submitted much new manuscript material on the music of the Mandan, Hidatsa, and Pawnee. With this addition her account of the Mandan-Hidatsa music contains 340 pages, more than 40 illustrations, and two new forms of graphic representation of their progression. This article is now ready for publication.

An important field of aboriginal music thus far not sufficiently investigated is among the Pawnee. While engaged in the study of the music of this tribe at Pawnee, Okla., Miss Densmore witnessed a Hand Game, the Buffalo, Lance, and two Victory dances, and later ecorded on the phonograph the numerous songs sung at the three rst gatherings. This material, with musical transcription tabulated nd descriptive analyses, has been purchased by the bureau.

Dr. Aleš Hrdlička, curator of physical anthropology, was detailed make an examination of the archeological remains of southwestrn Florida, especially of the shell heaps along the coast south of ey Marco, a region very little explored by archeologists and one of e least known sections of that State. In spite of difficulties, Dr. Irdlička's field work was successful. He visited several groups of hell heaps of large size as yet unrecorded and opened up a most intructive field for future exploration in a report which has been resented for publication. He also made highly important observaions on physical features of the remnants of Indians that still inabit the little known regions of Florida.

Mr. David I. Bushnell, jr., continued the preparation of manuscript or the Handbook of Aboriginal Remains East of the Mississippi, dding various notes to the manuscript. He likewise added about 30 ages to the manuscript entitled "Native Villages and Village Sites ast of the Mississippi," now being printed as Bulletin 69. During he same period he completed a manuscript bearing the title "Native emeteries and Forms of Burial East of the Mississippi," which is o appear as Bulletin 71 of the bureau series.

With an allotment from the bureau Mr. Gerard Fowke has been ngaged in special archeological investigations in the Ozark region f central Missouri. His careful detailed studies have been confined o the numerous caves in that region.

If "cave men," using this term to designate the predecessors of any ace or tribe known to history, ever existed in the Mississippi Valley, e would find in no part of it natural features better adapted for his equirements than the Ozark Hills, but so far not the slightest trace f his presence has been revealed. Products of human industry have een reported as occurring under other conditions at great depths, ven at the bottom of the loess, though in all such cases there is some ncertainty as to the correctness of the observations. On the conrary, whatever may be the depth of the deposit containing them, the rtificial objects exhumed are uniform in character from top to botom. The specimens found on the clay or solid rock floor are of the ame class as those barely covered by the surface earth. Moreover, hen they cease to appear they cease absolutely.

By careful search in the caves and rock shelters of which the Inian known to history availed himself extensive and interesting useum collections can be made. To find an earlier man it will be ecessary to investigate caverns which he found suitable for occuancy and in which the accumulation of detritus, from whatever urce, has been sufficient to cover his remains so deeply that they can not be confused with those of a later period, and it may be necessary to discover with them bones of extinct animals. No examination of a cavern is complete unless a depth is reached where glacial deposits are undeniably of such age as to antedate the possible appearance of man upon the scene. The Ozark region promises important revelations in the study of prehistoric man in America.

Mr. Fowke has thoroughly investigated one of the caves in this region and has prepared an important report on his work which will later be published by the bureau. He has also transmitted to the National Museum a collection which is the largest yet obtained from this locality. The results of the work thus far are technical and can not be adequately stated in this place, but are not only very important additions to the archeology of the region investigated but also highly significant in comparative studies of ancient man in North America.

MANUSCRIPTS.

In addition to the manuscripts submitted for publication by the bureau there was also obtained by purchase an article by Mr. C. S. Simmons dealing with the Peyote religion.

EDITORIAL WORK AND PUBLICATIONS.

The editing of the publications of the bureau was continued through the year by Mr. Stanley Searles, assisted by Mrs. Frances S. Nichols. The status of the publications is presented in the following summary:

PUBLICATIONS ISSUED.

Thirty-second Annual Report.—Accompanying paper: Seneca Fiction, Legends, and Myths (Hewitt and Curtin).

Bulletin 59.—Kutenai Tales (Boas).

Bulletin 61.—Teton Sioux Music (Densmore).

Bulletin 64.—The Maya Indians of Southern Yucatan and Northern British Honduras (Gann).

Bulletin 65.—Archæological Explorations in Northeastern Arizona (Kidder and Guernsey).

Bulletin 66.—Recent Discoveries of Remains Attributed to Early Man in America (Hrdlička).

List of publications of the bureau.

Introduction to Seneca Fiction, Legends, and Myths (Hewitt).—From Thirty-second Annual Report (Hewitt and Curtin).

PUBLICATIONS IN PRESS OR IN PREPARATION.

Thirty-third Annual Report.—Accompanying papers: (1) Uses of Plants by the Indians of the Missouri River Region (Gilmore); (2) Preliminary Account of the Antiquities of the Region between the Mancos and La Plata Rivers in Southwestern Colorado (Morris); (3) Designs on Prehistoric Hopi Pottery (Fewkes); (4) The Hawaiian Romance of Laieikawai (Beckwith).

Thirty-fourth Annual Report.—Accompanying paper: Prehistoric island culture areas of America (Fewkes).

Thirty-fifth Annual Report.—Accompanying paper: Ethnology of the Kwakiutl (Boas).

Thirty-sixth Annual Report.—Accompanying paper: Early History of the Creek Indians and their Neighbors (Swanton).

Bulletin 40.—Part 2: Handbook of American Indian Languages (Boas).

Bulletin 60.—Handbook of Aboriginal American Antiquities: Part 1. Introduction; The Lithic Industries (Holmes).

Bulletin 67.—Alsea Texts and Myths (Frachtenberg).

Bulletin 68.—Structural and Lexical Comparison of the Tunica, Chitimacha, and Atakapa Languages (Swanton).

Bulletin 69.—Native Villages and Village Sites East of the Mississippi (Bushnell).

Bulletin 70.—Prehistoric Villages, Castles, and Towers (Fewkes).

Bulletin 71.—Native Cemeteries and Forms of Burial East of the Mississippi (Bushnell).

DISTRIBUTION OF PUBLICATIONS.

The distribution of the publications has been continued under the immediate charge of Miss Helen Munroe, assisted by Miss Emma B. Powers.

Publications were distributed as follows:

Reports and separates	2, 742
Bulletins and separates	8, 440
Contributions to North American Ethnology	10
Introductions	10
Miscellaneous	281
	11, 483

As compared with the fiscal year 1918, there was an increase of 4,139 publications distributed. This was doubtless due to the fact that whereas in the fiscal year 1918 only Bulletin 63 was distributed to the mailing list, during the fiscal year 1919 there were distributed to the list Bulletins 59, 61, 64, and 66, and the Thirty-second Annual Report. Fourteen addresses have been added to the mailing list during the year and 36 dropped, making a net decrease of 22.

ILLUSTRATIONS.

Mr. DeLancey Gill, with the assistance of Mr. Albert E. Sweeney, continued the preparation of the illustrations of the bureau and gave the usual time to photography of visiting Indians. A summary of this work follows:

Negatives for publication work	138
Negative films exposed in field	228
Photographic prints	603
Photostat copies	128
Drawings for publication	200
Illustrations made ready for engraving	2, 000
Engraved proofs edited	310
Colored illustrations inspected at Government Printing Office	10, 000

LIBRARY.

The reference library continued in the immediate charge of Miss Ella Leary, assisted by Mr. Charles B. Newman, who was absent a short time in the military service.

During the year 380 books were accessioned, of which 90 were acquired by purchase, 160 by gifts and exchange, and 130 by the entry of newly bound volumes of periodicals previously received. The periodicals currently received number about 760, of which 25 were received by subscription and 735 through exchange. In addition, the bureau acquired 210 pamphlets. The aggregate number of books in the library at the close of the year was 22,560; of pamphlets about 14,248. In addition, there were many volumes of unbound periodicals. The publication of various European periodicals devoted to anthropology has either been suspended or has ceased.

The number of books bound during the year was 350. It has been almost exclusively work upon the current material—serials grouped into volumes and new accessions in paper covers.

Correspondence relative to new exchanges and missing parts of serial publications already in the library was carried on as in previous years. Considerable time was given to research work, which frequently calls for the preparation of bibliographic lists for correspondents.

In addition to the use of its own library, it was found necessary to draw on the Library of Congress from time to time for the loan of about 400 volumes. The Library of Congress, officers of the executive departments, and out-of-town students have made use of the library through frequent loans during the course of the year.

The need by the library of additional shelf room is becoming more and more acute. Each day the congestion increases. We have filled almost every available foot of shelf space and we are sorely in need of more room.

The recataloguing of books from the old author (card) catalogue to a new subject catalogue has continued, and as a result the year shows a marked increase in the total of cards filed in the catalogue records.

The Monthly Bulletin for the use of the bureau has been continued throughout the year.

COLLECTIONS.

The following collections acquired by members of the staff of the bureau, or by those detailed in connection with its researches, have been transferred to the United States National Museum:

Two skeletons with skulls, found on the property of the Roxana Petroleum Co. of Oklahoma, South Wood River, Ill., and presented by it to this bureau. (62630.)

Twelve prehistoric pottery heads found in Huaxtec mounds and presented to Dr. J. Walter Fewkes by Mr. John M. Muir, of Tampico, Mexico. (62931.)

Thirty-one archeological specimens obtained by Mr. F. W. Hodge at Hawikuh, N. Mex., in 1917, as part of the cooperative work of the Bureau of American Ethnology and the Museum of the American Indian (Heye Foundation). (63154.)

Forty archeological specimens and an Indian skull, from different localities in Arizona; collected for the bureau by Dr. Walter Hough in 1918. (63156.)

Two hundred and eighty-eight archeological specimens and two lots of skeletal material, from Gourd Creek, Mo.; collected by Gerard Fowke in 1918. (63157.)

A specimen of slag with embedded charred corn; collected by Dr. J. Walter Fewkes, from a ruin in Mancos Valley, 3 miles west of the bridge on the Cortez-Ship Rock Road, Colorado. (63174.)

Sandstone pipe found on Black Warrior River, Tuscaloosa County, Ala., and presented to the bureau by Mr. F. H. Davis, United States Engineer's Office, Little Rock, Ark. (63509.)

Pillar stone found at Cerro Cebadilla, Vera Cruz; gift of Dr. H. Adrian, Tampico, Mexico. (63523.)

Three well-made clay heads from the neighborhood of Panuco, Mexico; gift of Mr. John M. Muir. (63524.)

PROPERTY.

Furniture was purchased to the amount of $128.76. The cost of typewriting machines was $143.40, making a total of $272.16.

MISCELLANEOUS.

Clerical.—The correspondence and other clerical work of the office, including the copying of manuscripts, has been conducted by Miss May S. Clark, clerk to the chief. Mrs. Frances S. Nichols assisted the editor.

There has been no change in the scientific or clerical force.

Respectfully submitted.

J. Walter Fewkes, *Chief.*

Dr. Charles D. Walcott,
Secretary Smithsonian Institution.

ments in boxes are being made as frequently as present conditions will permit to all countries except Austria, Bulgaria, Germany, Hungary, Montenegro, Roumania, Russia, Serbia, and Turkey. It is not thought advisable to forward consignments to these until the peace treaties with the enemy countries are finally ratified by the United States Government and internal conditions become more settled. It is hoped that in the early part of the next fiscal year it will be possible to make shipments to all countries.

To some countries transmissions were not wholly suspended for any long period during the war. However, as was to be expected during such abnormal times, the institution met with many obstacles in its efforts to keep the exchanges open. The charge for ocean freight grew to great proportions. The rate to England, for instance, at one time reached $5.80 per cubic foot. The charge on shipments to that country before the war was $0.16 a cubic foot, thus making the increase more than thirty-sixfold. Such rates becoming too exorbitant, the sending of packages in boxes was discontinued, and the mails were resorted to. Late in the fiscal year, when shipments were resumed to Belgium and the northern neutrals, the office was almost swamped with packages which had been accumulating for those countries for many months.

The chief of the Belgian Service of International Exchanges, in reply to a letter addressed to him early in February asking if his bureau was in a position to resume the distribution of exchanges, stated that there were no longer any obstacles to the renewal of the relations which had been interrupted on acount of the encirclement of iron and fire in which his country found itself during the war. He added:

> I should fail most lamentably in my duty, Mr. Secretary, if I did not add to this reply warm thanks in the name of the Belgian Government, in the name of our scientific establishments and institutions, and in my own name, for the extreme kindness which you have shown us in reserving for us until the present time, all the numerous "series" and "collections," one and all of inestimable value, which the war has prevented you from transmitting to us at the proper time.

Applications for permission to forward publications abroad through the service are being received from time to time, both from new and long-established institutions. As an illustration of appreciation of the value of the service by such organizations, may be quoted the following extract from a communication from the New York State College of Forestry at Syracuse, acknowledging the receipt of the Institution's letter extending the exchange facilities to that college:

> It will mean a good deal to us in developing the exchange of publications for the forest library of this college.

Reference was made in last year's report to the steps being taken by the institution to procure for the war library and museum of the French Government at Paris copies of American documents, and other material relating to the war, for deposit in a section of that library, to be devoted to the part taken by the United States in the conflict. A similar request for posters was received during the year from the British War Museum, and as complete sets of posters as it was possible to procure, have been transmitted to that museum. A number of requests for publications issued in this country were received from other foreign establishments, and in each instance the institution endeavored to comply therewith.

The secretary of the institution took special steps to assist in the rehabilitation of the library of the Society of Sciences, Lille, France, whose collections were destroyed during the war. As a result of his efforts, several hundred publications were received for transmission to that library through the Exchange Service.

During the fiscal year 1919, 803 boxes were forwarded to foreign agencies for distribution, being an increase of 360 over the preceeding 12 months. Notwithstanding this increase in the number of boxes sent, the total number is still far below the average for a normal year. This is due, in part, to the fact that shipments in boxes were suspended until the 1st of February. Up to that date packages were sent to their destinations by mail.

The dates of transmission of the 803 boxes forwarded to foreign countries are shown in the following table. Of these boxes 260 contained full sets of United States official documents for authorized depositories:

Consignments of exchanges for foreign countries.

Country.	Number of boxes.	Date of transmission.
Argentina	19	Apr. 8, 1919.
Belgium	72	Apr. 29, 1919.
Bolivia	2	Mar. 28, 1919.
Brazil	15	Feb. 8, Apr. 5, 1919.
British colonies	5	Apr. 29, June 12, 1919.
British Guiana	1	Mar. 27, 1919.
Canada	24	Sept. 26, 1918; Jan. 27, Mar. 25, Apr. 21, May 17, June 6, 1919.
Chile	9	Apr. 3, 1919.
China	8	Jan. 20, 1918; Feb. 28, Mar. 25, May 28, 1919.
Colombia	6	Mar. 31, 1919.
Costa Rica	8	Apr. 4, 1919.
Cuba	6	Sept. 26, 1918; Jan. 27, Mar. 25, Apr. 21, May 17, June 6, 1919.
Denmark	21	Feb. 19, 1919.
Ecuador	3	Mar. 4, 1919.
Egypt	14	Apr. 10, 1919.
France	57	Feb. 8, May 5, 1919.
Great Britain and Ireland.	196	Feb. 5, Mar. 12, 25, May 12, June 2, 12, 1919
Guatemala	2	Mar. 28, 1919.

Consignments of exchanges for foreign countries—Continued.

Country.	Number of boxes.	Date of transmission.
Haiti	5	Apr. 9, 1919.
Honduras	2	Mar. 4, 1919.
India	24	Feb. 12, June 19, 1919.
Italy	31	June 17, 1919.
Jamaica	4	Mar. 26, 1919.
Japan	20	Apr. 16, 1919.
Mexico	6	Sept. 26, 1918; Jan. 27, Mar. 25, Apr. 21, May 17, June 6, 1919.
Netherlands	54	Mar. 11, June 30, 1919.
Nicaragua	1	Mar. 28, 1919.
Norway	20	Feb. 19, 1919.
Paraguay	2	Mar. 28, 1919.
Peru	6	Apr. 2, 1919.
Queensland	8	Feb. 5, May 12, June 12, 1919.
Salvador	2	Mar. 28, 1919.
Spain	15	Apr. 22, 1919.
Sweden	53	Feb. 25, 1919.
Switzerland	25	June 30, 1919.
Tasmania	9	Feb. 5, May 12, June 12, 1919.
Union of South Africa	15	June 26, 1919.
Uruguay	7	Apr. 1, 1919.
Venezuela	5	Mar. 31, 1919.
Victoria	11	Feb. 13, 1919.
Western Australia	10	Feb. 5, May 12, June 12, 1919.

FOREIGN DEPOSITORIES OF UNITED STATES GOVERNMENTAL DOCUMENTS.

Ninety-one sets of United States governmental documents (55 full sets and 36 partial sets) were received for distribution in accordance with treaty stipulations and under the authority of the congressional resolutions of March 2, 1867, and March 2, 1901.

A complete list of the foreign depositories is given below. Consignments for those countries to which shipments were suspended on account of the war will be forwarded to the various depositories as soon as the peace treaties are ratified by the United States Government.

DEPOSITORIES OF FULL SETS.

ARGENTINA: Ministerio de Relaciones Exteriores, Buenos Aires.
AUSTRALIA: Library of the Commonwealth Parliament, Melbourne.
AUSTRIA: K. K. Statistische Zentral-Kommission, Vienna.
BADEN: Universitäts-Bibliothek, Freiburg. (Depository of the Grand Duchy of Baden.)
BAVARIA: Königliche Hof- und Staats-Bibliothek, Munich.
BELGIUM: Bibliothèque Royale, Brussels.
BRAZIL: Bibliotheca Nacional, Rio de Janeiro.
BUENOS AIRES: Biblioteca de la Universidad Nacional de La Plata. (Depository of the Province of Buenos Aires.)
CANADA: Library of Parliament, Ottawa.
CHILE: Biblioteca del Congreso Nacional, Santiago.

China: American-Chinese Publication Exchange Department, Shanghai Bureau of Foreign Affairs, Shanghai.
Colombia: Biblioteca Nacional, Bogotá.
Costa Rica: Oficina de Depósito y Canje Internacional de Publicaciones, San José.
Cuba: Secretaria de Estado (Asuntos Generales y Canje Internacional), Habana.
Denmark: Kongelige Bibliotheket, Copenhagen.
England: British Museum, London.
France: Bibliothèque Nationale, Paris.
Germany: Deutsche Reichstags-Bibliothek, Berlin.
Glasgow: City Librarian, Mitchell Library, Glasgow.
Greece: Bibliothèque Nationale, Athens.
Haiti: Secrétaire d'État des Relations Extérieures, Port au Prince.
Hungary: Hungarian House of Delegates, Budapest.
India: Imperial Library, Calcutta.
Ireland: National Library of Ireland, Dublin.
Italy: Biblioteca Nazionale Vittorio Emanuele, Rome.
Japan: Imperial Library of Japan, Tokyo.
London: London School of Economics and Political Science. (Depository of the London County Council.)
Manitoba: Provincial Library, Winnipeg.
Mexico: Instituto Bibliográfico, Biblioteca Nacional, Mexico.
Netherlands: Bibliotheek van der Staten-Generaal, The Hague.
New South Wales: Public Library of New South Wales, Sydney.
New Zealand: General Assembly Library, Wellington.
Norway: Storthingets Bibliothek, Christiania.
Ontario: Legislative Library, Toronto.
Paris: Préfecture de la Seine.
Peru: Biblioteca Nacional, Lima.
Portugal: Bibliotheca Nacional, Lisbon.
Prussia: Königliche Bibliothek, Berlin.
Quebec: Library of the Legislature of the Province of Quebec, Quebec.
Queensland: Parliamentary Library, Brisbane.
Russia: Imperial Public Library, Petrograd.
Saxony: Königliche Oeffentliche Bibliothek, Dresden.
Serbia: Section Administrative du Ministère des Affaires Étrangères, Belgrade.
South Australia: Parliamentary Library, Adelaide.
Spain: Servicio del Cambio Internacional de Publicaciones, Cuerpo Facultativo de Archiveros, Bibliotecarios y Arqueólogos, Madrid.
Sweden: Kungliga Biblioteket, Stockholm.
Switzerland: Bibliothèque Fédérale Centrale, Berne.
Tasmania: Parliamentary Library, Hobart.
Turkey: Department of Public Instruction, Constantinople.
Union of South Africa: State Library, Pretoria, Transvaal.
Uruguay: Oficina de Canje Internacional de Publicaciones, Montevideo.
Venezuela: Biblioteca Nacional, Caracas.
Victoria: Public Library of Victoria, Melbourne.
Western Australia: Public Library of Western Australia, Perth.
Württemberg: Königliche Landesbibliothek, Stuttgart.

DEPOSITORIES OF PARTIAL SETS.

Alberta: Provincial Library, Edmonton.
Alsace-Lorraine: K. Ministerium für Elsass-Lothringen, Strassburg.
Bolivia: Ministerio de Colonización y Agricultura, La Paz.

Bremen: Senatskommission für Reichs- und Auswärtige Angelegenheiten.
British Columbia: Legislative Library, Victoria.
British Guiana: Government Secretary's Office, Georgetown, Demerara.
Bulgaria: Minister of Foreign Affairs, Sofia.
Ceylon: Colonial Secretary's Office (Record Department of the Library), Colombo.
Ecuador: Biblioteca Nacional, Quito.
Egypt: Bibliothèque Khédiviale, Cairo.
Finland: Chancery of Governor, Helsingfors.
Guatemala: Secretary of the Government, Guatemala.
Hamburg: Senatskommission für die Reichs- und Auswärtigen Angelegenheiten.
Hesse: Grossherzogliche Hof-Bibliothek, Darmstadt.
Honduras: Secretary of the Government, Tegucigalpa.
Jamaica: Colonial Secretary, Kingston.
Liberia: Department of State, Monrovia.
Lourenço Marquez: Government Library, Lourenço Marquez.
Lübeck: President of the Senate.
Madras, Province of: Chief Secretary to the Government of Madras, Public Department, Madras.
Malta: Lieutenant Governor, Valetta.
Montenegro: Ministère des Affaires Étrangères, Cetinje.
New Brunswick: Legislative Library, Fredericton.
Newfoundland: Colonial Secretary, St. John's.
Nicaragua: Superintendente de Archivos Nacionales, Managua.
Northwest Territories: Government Library, Regina.
Nova Scotia: Provincial Secretary of Nova Scotia, Halifax.
Panama: Secretaria de Relaciones Exteriores, Panama.
Paraguay: Oficina General de Inmigracion, Asuncion.
Prince Edward Island: Legislative Library, Charlottetown.
Roumania: Academia Romana, Bucharest.
Salvador: Ministerio de Relaciones Exteriores, San Salvador.
Siam: Department of Foreign Affairs, Bangkok.
Straits Settlements: Colonial Secretary, Singapore.
United Provinces of Agra and Oudh: Under Secretary to Government, Allahabad.
Vienna: Bürgermeister der Haupt- und Residenz-Stadt.

INTERPARLIAMENTARY EXCHANGE OF OFFICIAL JOURNALS.

The Governments named below have entered into the interparliamentary exchange of official journals with the United States and are listed to receive copies of the daily issue of the Congressional Record:

Argentine Republic.
Australia.
Austria.
Baden.
Belgium.
Bolivia.
Brazil.
Buenos Aires, Province of.
Canada.
Costa Rica.
Cuba.
Denmark.
France.
Great Britain.
Greece.
Guatemala.
Honduras.
Hungary.
Italy.
Liberia.
New South Wales.
New Zealand.
Peru.
Portugal.
Prussia.
Queensland.
Roumania.
Russia.
Serbia.
Spain.
Switzerland.
Transvaal.
Union of South Africa.
Uruguay.
Venezuela.
Western Australia.

FOREIGN EXCHANGE AGENCIES.

A letter was received in April, 1919, from the director of the National Library in Lisbon, stating that the general secretariat of the Library and National Archives had been abolished and that the Service of International Exchanges, created by the Brussels Convention of March 15, 1886, is now conducted under the direction of his library.

Below is given a complete list of the foreign exchange agencies or bureaus. Shipments to those countries marked with an asterisk were still suspended at the close of the fiscal year.

ALGERIA, *via* France.
ANGOLA, *via* Portugal.
ARGENTINA: Comisión Protectora de Bibliotecas Populares, Lavalle 1216, Buenos Aires.
AUSTRIA:* K. K. Statistische Zentral-Kommission, Vienna.
AZORES, *via* Portugal.
BELGIUM: Service Belge des Échanges Internationaux, Rue des Longs-Chariots 46, Brussels.
BOLIVIA: Oficina Nacional de Estadística, La Paz.
BRAZIL: Serviço de Permutações Internacionaes, Bibliotheca Nacional, Rio de Janeiro.
BRITISH COLONIES: Crown Agents for the Colonies, London.
BRITISH GUIANA: Royal Agricultural and Commercial Society, Georgetown.
BRITISH HONDURAS: Colonial Secretary, Belize.
BULGARIA:* Institutions Scientifiques de S. M. le Roi de Bulgarie, Sofia.
CANARY ISLANDS, *via* Spain.
CHILE: Servicio de Canjes Internacionales, Biblioteca Nacional, Santiago.
CHINA: American-Chinese Publication Exchange Department, Shanghai Bureau of Foreign Affairs, Shanghai.
COLOMBIA: Oficina de Canjes Internacionales y Reparto, Biblioteca Nacional, Bogotá.
COSTA RICA: Oficina de Depósito y Canje Internacional de Publicaciones, San José.
DENMARK: Kongelige Danske Videnskabernes Selskab, Copenhagen.
DUTCH GUIANA: Surinaamsche Koloniale Bibliotheek, Paramaribo.
ECUADOR: Ministerio de Relaciones Exteriores, Quito.
EGYPT: Government Publications Office, Printing Department, Bulaq, Cairo.
FRANCE: Service Français des Échanges Internationaux, 110 Rue de Grenelle, Paris.
GERMANY: Amerika-Institut, Berlin, N. W. 7.
GREAT BRITAIN AND IRELAND: Messrs. William Wesley & Son, 28 Essex Street, Strand, London.
GREECE: Bibliothèque Nationale, Athens.
GREENLAND, *via* Denmark.
GUADELOUPE, *via* France.
GUATEMALA: Instituto Nacional de Varones, Guatemala.
GUINEA, *via* Portugal.
HAITI: Secrétaire d'État des Relations Extérieures, Port au Prince.
HONDURAS: Biblioteca Nacional, Tegucigalpa.
ICELAND, *via* Denmark.

INDIA: Superintendent of Stationery, Bombay.

ITALY: Ufficio degli Scambi Internazionali, Biblioteca Nazionale Vittorio Emanuele, Rome.

JAMAICA: Institute of Jamaica, Kingston.

JAPAN: Imperial Library of Japan, Tokyo.

JAVA, *via* Netherlands.

KOREA: Government General, Keijo.

LIBERIA: Bureau of Exchanges, Department of State, Monrovia.

LOURENÇO MARQUEZ: Government Library, Lourenço Marquez.

LUXEMBURG, *via* Germany.

MADAGASCAR, *via* France.

MADEIRA, *via* Portugal.

MONTENEGRO:* Ministère des Affaires Étrangères, Cetinge.

MOZAMBIQUE, via Portugal.

NETHERLANDS: Bureau Scientifique Central Néerlandais, Bibliothèque de l'Université, Leyden.

NEW GUINEA, *via* Netherlands.

NEW SOUTH WALES: Public Library of New South Wales, Sydney.

NEW ZEALAND: Dominion Museum, Wellington.

NICARAGUA: Ministerio de Relaciones Exteriores, Managua.

NORWAY: Kongelige Norske Frederiks Universitet Bibliotheket, Christiania.

PANAMA: Secretaria de Relaciones Exteriores, Panama.

PARAGUAY: Servicio de Canje Internacional de Publicaciones Sección Consular y de Comercio, Ministerio de Relaciones Exteriores, Asuncion.

PERSIA: Board of Foreign Missions of the Presbyterian Church, New York City.

PERU: Oficina de Reparto, Depósito y Canje Internacional de Publicaciones, Ministerio de Fomento, Lima.

PORTUGAL: Serviço de Permutacões Internacionaes, Bibliotheca Nacional, Lisbon.

QUEENSLAND: Bureau of Exchanges of International Publications, Chief Secretary's Office, Brisbane.

ROUMANIA:* Academia Romana, Bucharest.

RUSSIA: Commission Russe des Échanges Internationaux, Bibliothèque Impériale Publique, Petrograd.

SALVADOR: Ministerio de Relaciones Exteriores, San Salvador.

SERBIA:* Section Administrative du Ministère des Affaires Etrangères, Belgrade.

SIAM: Department of Foreign Affairs, Bangkok.

SOUTH AUSTRALIA: Public Library of South Australia, Adelaide.

SPAIN: Servicio del Cambio Internacional de Publicaciones, Cuerpo Facultativo de Archiveros, Bibliotecarios y Arqueólogos, Madrid.

SUMATRA, *via* Netherlands.

SWEDEN: Kongliga Svenska Vetenskaps Akademien, Stockholm.

SWITZERLAND: Service des Échanges Internationaux, Bibliothèque Fédérale Centrale, Berne.

SYRIA: Board of Foreign Missions of the Presbyterian Church, New York.

TASMANIA: Secretary to the Premier, Hobart.

TRINIDAD: Royal Victoria Institute of Trinidad and Tobago, Port-of-Spain.

TUNIS, via France.

TURKEY:* American Board of Commissioners for Foreign Missions, Boston.

UNION OF SOUTH AFRICA: Government Printing Works, Pretoria, Transvaal.

URUGUAY: Oficina de Canje Internacional, Montevideo.

VENEZUELA: Biblioteca Nacional, Caracas.

Victoria: Public Library of Victoria, Melbourne.
Western Australia: Public Library of Western Australia, Perth.
Windward and Leeward Islands: Imperial Department of Agriculture, Bridgetown, Barbados.

PERSONNEL.

With his appointment as assistant secretary of the Smithsonian Institution on December 16, 1918, Dr. Charles G. Abbot was assigned to general charge of the international exchanges and the library in addition to the directorship of the Astrophysical Observatory.

Respectfully submitted.

C. G. Abbot,
Assistant Secretary,
In Charge of Library and Exchanges.

Dr. Charles D. Walcott,
Secretary of the Smithsonian Institution.

APPENDIX 4.

REPORT ON THE NATIONAL ZOOLOGICAL PARK.

SIR: I have the honor to submit the following report on the operations of the National Zoological Park for the fiscal year ending June 30, 1919:

Recognizing the increased cost of maintenance, Congress allowed in the sundry civil bill the sum of $115,000 for the expenses of the park, with an additional allotment of $200 for printing and binding. This was an increase of $15,000 over the appropriation for the preceding years. By the practice of great economy in all departments, a small amount was made available from this sum for minor permanent improvements, and some long-needed work was accomplished during the year. Several of the employees who were in the military or naval service during the war returned to their duties at the park near the close of the year, and there is at present no distinct shortage of help except in the buildings and grounds department. The popularity of the Zoological Park continues to increase, and the number of visitors admitted to the grounds greatly exceeded that of any previous year. An attendance of nearly 2,000,000 was recorded. Notwithstanding the scarcity of help during the first months of the year, the buildings have been kept in a fair state of repair and the grounds are in a very good condition. The collection has been kept near normal size, with even slight increase in the number of specimens, and with no serious gaps or empty quarters. This is due almost entirely to the constant and efficient care of the employees in the animal department, with the resulting good condition and low death rate among their charges. The embargo on living animals during the war virtually prohibited importations, and only a few animals were received directly from foreign ports.

ACCESSIONS.

Gifts.—Animals to the number of 74 were accessioned during the year as gifts from friends of the park, or were placed on indefinite deposit.

Two young Sumatran elephants received from the Smithsonian Institution were the most important and valuable additions to the collection. These were purchased at a cost of $5,000 for the children of Washington by a number of their friends, and were donated to the institution. At the time of their arrival they were about 2 and

2½ years old and were 42 and 45 inches high. The Sumatran elephant had never before been exhibited in Washington. It is closely allied to the elephant of India, and differs from the African elephant in many characters, most conspicuous of which is the very small size of the ear. No specimen of this group of elephants has been in the collection since the death in March, 1917, of the old Indian elephant, "Dunk." The Sumatran elephant is said to average somewhat smaller than the elephant from British India, but the Dutch trader who accompanied these young animals from Sumatra reports having killed one which was 10 feet high at the shoulder. The baby elephants are already great favorites with the children and are growing rapidly. They are known by their Malayan names of "Hitam" (black) and "Kechil" (small).

Other particularly valuable donations were a fine capybara from Hon. Henry D. Baker, Trinidad, British West Indies, who has presented the park with other interesting specimens in past years; and a pair of Florida bears from Mrs. A. V. N. Stroop, Moore Haven, Fla. The capybara is an especially good specimen of this largest of all living rodents, and the Florida bear has never before been shown in the collection. The bears are still young, but will apparently grow to a much larger size than the common American black bears, as they are now considerably larger than Virginia specimens of approximately the same age, and the bears of Florida are known sometimes to exceed in size all other forms of the black bear.

Among the birds presented during the year the most important is an example of the great white heron of southern Florida, taken from the nest on one of the Newfound Harbor group of keys, Florida, May 12, 1919, by Dr. Paul Bartsch. This bird has developed splendidly and forms one of the unique exhibits of the bird department.

The complete list of donors and gifts is as follows:

Hon. Henry D. Baker, Trinidad, British West Indies, capybara.
Miss Marjarie Bandelauter, Washington, D. C., alligator.
Dr. Paul Bartsch, Washington, D. C., great white heron.
Mr. J. E. Boyle, Washington, D. C., horned toad.
Mr. Morris K. Brady, Washington, D. C., alligator.
Miss Eddie Capps, Schuyler, Va., alligator.
Mr. Frederick Chester, Washington, D. C., alligator.
Mr. E. R. Claud, Washington, D. C., horned toad.
Mrs. V. Cook, Savannah, Ga., alligator.
Mr. W. R. Coon, Washington, D. C., alligator.
Miss Pauline Corson, Guinea Mills, Va., four gray foxes.
Mr. Lee Cummins, Washington, D. C., two alligators.
Mr. A. H. Davin, Palmyra, Va., five turtle doves.
Miss Elisabeth T. Davison, Baltimore, Md., two grass paroquets.
Mr. D. L. Du Pre, Washington, D. C., American barn owl.
Mr. L. A. Ehrmantraut, Washington, D. C., chicken-guinea hybrid.

Mr. W. H. Fairchild, Washington, D. C., red fox.
Mr. J. F. E. Fields, Hancock, Md., banded rattlesnake.
Mr. F. F. Gillen, Washington, D. C., three screech owls.
Mrs. Lillie M. Glover, Washington, D. C., Isle of Pines parrot.
Mrs. Gregory, Washington, D. C., Virginia opossum.
Mrs. S. M. Hesey, Edinburg, Va., Cuban parrot.
Mr. Charles P. Higgins, Washington, D. C., alligator.
Mr. John B. Laing, Lewisburg, W. Va., black bear.
Mr. Edward L. Latimer, Hyattsville, Md., great horned owl.
Mr. Maynadiers, Washington, D. C., Virginia opossum.
Mr. W. L. McAtee, Washington, D. C., rainbow snake.
Mr. J. C. Meyer, Washington, D. C., three canary birds.
Mr. H. D. Money, jr., Gulfport, Miss., two fox squirrels.
Mr. James Mooney, jr., Washington, D. C., alligator.
Mrs. C. P. Moore, Washington, D. C., alligator.
Mr. Joseph G. Moore, Flint Hill, Va., two woodchucks.
Mr. Charles A. Mosier, Holmstead, Fla., moccasin snake.
Mr. R. E. Otterback, Washington, D. C., black snake.
Mr. A. J. Poole, Washington, D. C., water snake.
Mr. G. R. Putnam, Washington, D. C., horned toad.
Mr. T. M. Quill, Washington, D. C., alligator.
Mr. E. S. Schmid, Washington, D. C., spider monkey.
Dr. R. W. Shufeldt, Washington, D. C., water snake, garter snake, snapping turtle, Florida terrapin, and two gopher tortoises.
Maj. Walter L. Simpson, Washington, D. C., badger.
Smithsonian Institution, Washington, D. C., two Sumatran elephants.
Mr. J. F. Stowell, Washington, D. C., alligator.
Mr. Blanford Straughn, Washington, D. C., chameleon.
Mrs. A. V. N. Stroop, Moore Haven, Fla., two Florida bears.
Mrs. Griffin E. Taylor, Berryville, Va., double yellow-head parrot.
Mr. Albert Thorn, Washington, D. C., alligator.
Mr. Henry C. Vaden, Washington, D. C., peafowl.
Mr. J. S. Warmbath, Washington, D. C., screech owl.
Mrs. Sarah Wilber, Keshena, Wis., American badger.
Mr. J. M. Willson, Kissimmee, Fla., sand-hill crane.
Mr. H. F. Winn, Chevy Chase, D. C., peafowl.
Mr. H. E. Wright, Point of Rocks, Md., alligator.
Unknown donor, fish crow.

Births.—The number of births exceeds that of any previous year in the history of the park. Mammals to the number of 76 were born, and 83 birds were hatched during the year, making a total of 159 additions to the collection in this manner. This record includes only such animals as are reared to a reasonable age, no account being made in these published statistics of such as live but a few days. The births include 2 European bears, 2 Rocky Mountain sheep, 1 eland, 4 Indian antelopes, 1 yak, 6 American bison, 2 llamas, 1 Columbian black-tailed deer, 2 Manchurian deer, 2 Kashmir deer, 2 American elk, 2 barasingha deer, 1 hog deer, 4 Japanese deer, 1 fallow deer, 6 white-tailed deer, 6 European red deer, 1 yellow-haired porcupine, 4 raccoons, 6 coypus, 3 rhesus monkeys, 1 dusky phalanger, 1 rufous-bellied wallaby, 1 great gray kangaroo, 4 red kangaroos, 8 opossums, and 2 brush-tailed rock kangaroos. The birds hatched are of the following species: Demoiselle crane, American coot, Florida cormorant, night heron, wild turkey, golden pheasant, peafowl, scaled quail, mute swan, Canada goose, mallard, black duck, and wood duck.

Exchanges.—There were received during the year 11 mammals and 70 birds in exchange for surplus animals born in the park. The mammals were 2 prong-horned antelopes, 2 Indian water buffaloes, 3 beavers, 3 spider monkeys, and 1 Burmese macaque. Many desirable water fowl, including coscoroba and black swans, Hutchins's geese, European widgeon, European teal, garganey teal, black-bellied tree ducks, and spur-winged geese, as well as numerous land birds needed for the collection, were received through exchange. Species new to the collection are the black-gorgeted laughing thrush, crimson tanager, blue tanager, thick-billed euphonia, diamond dove, bar-shouldered dove, short-keeled toucan, and a fine specimen of the remarkable Goliath heron from Africa.

Purchases.—Because of lack of funds only 38 mammals, birds, and reptiles were purchased during the year. A Malayan sun bear was obtained in San Francisco, a fallow deer buck was purchased for breeding, and a few small mammals were bought from time to time. Additions to the American waterfowl lake were 6 brants, 2 white-fronted geese, 10 black ducks, and an immature whistling swan. Two Florida sandhill cranes and a pair of bronze-wing pigeons, with some commoner hawks and owls, also were purchased.

Transfers.—Both the Biological Survey of the Department of Agriculture and the Bureau of Fisheries, Department of Commerce, contributed to the collection by the transfer of material collected by their agents in the field. From the Biological Survey was received an Apache grizzly bear and a mountain lion from New Mexico, a blue goose from Missouri, and two pigmy ground rattlers and a water snake from Florida. The Apache grizzly, new to the collection, is one of the recently defined species of the grizzly bear now nearing extinction. The specimen, a young male, was captured July 22, 1918, by T. J. McMullin and Bob Reid, 22 miles southeast of Taos, N. Mex., and was forwarded to the park by M. E. Musgrave, of the Biological Survey. It was apparently about 8 months old when received. A few turtles from Georgia were transferred from the Bureau of Fisheries.

Captured in the park.—A few birds captured in the park were added to the collection.

Deposited.—As usual, a number of desirable exhibition specimens were accepted on temporary deposit. These included for the year 7 parrots of various species, 2 boa constrictors, a lion, and a kinkajou. Eight alligators were carried over the winter for the Pan American Union.

REMOVALS.

Surplus mammals and birds to the number of 37 were exchanged to other zoological collections, as follows: One European brown bear, 1 hippopotamus, 2 red kangaroos, 1 yak, 3 Indian antelopes, 1 fallow deer, 2 hog deer, 1 Japanese deer, 4 barasingha deer, 4 European red deer, 6 gray squirrels, 2 domestic geese, and 9 peafowl. A number of specimens on deposit were returned to owners.

While the death rate for the year has been comparatively small, there have been as usual some serious losses, especially among animals long in the park and of advanced age. The male Celebesian dwarf buffalo, or anoa (*Anoa depressicornis*), which has been a feature of the antelope house for nearly 13 years, died on July 24, 1918. This animal came to the collection December 12, 1905, then fully adult, had been showing extreme age for the past two years, and his death was not unexpected. Two female Congo harnessed antelopes (*Tragelaphus gratus*) were lost. One was purchased as a fully grown animal October 31, 1907, and died May 10, 1919. The other, born in the park July 4, 1912, died February 27, 1919. An old female American bison, purchased May 6, 1907, died of septic metritis on April 20, 1919. A female guanaco, received from the zoological gardens in Buenos Aires, December 29, 1904, died on August 22, 1918, of acute congestion of the lungs, after 13 years and 8 months of life in the park. An alpaca, also from the Buenos Aires gardens, received March 14, 1908, died from old age and parasitic invasion, October 11, 1918. A wild cat (*Lynx ruffus*), received September 3, 1907, died January 22, 1919; and a Canada lynx, received September 25, 1907, died from septicemia September 25, 1918, exactly 11 years from the date of its arrival in the zoo. Other losses of importance among the mammals were a leopard, from pneumonia, November 18, 1918, and a young Brazilian tapir, born in the park February 22, 1918, which died under anesthetic during an operation for prolapse of the rectum on June 3, 1919.

The most serious loss by death among the birds was a female trumpeter swan, which died of septicemia May 14, 1919, just after it had been successfully mated, after two years of effort, with the male trumpeter lent to the park by Judge R. M. Barnes, of Lacon, Ill. The eggs in the ovary were enlarged to the size of cherries, and there is every reason to believe that but for the untimely loss of this bird the swans would have been successfully bred. The African crowned hawk-eagle (*Spizaëtus coronatus*) received from James Robert Spurgeon, United States Secretary of Legation, Monrovia, Liberia, June 24, 1901, died from avian tuberculosis, March 26, 1919, after 17 years and 9 months of life in the bird house. Two wandering tree ducks (*Dendrocygna arcuata*), received from Carl Hagenbeck, September 25, 1903, died, probably of old age, on September 30 and December 16, 1918, both having thus lived over 15 years in the gardens. A snowy egret (*Egretta candidissima*), received from Texas, June 15, 1907, died July 10, 1918, over 11 years from the date of its arrival.

Post-mortem examinations were made by the pathological division of the Bureau of Animal Industry. The following list shows the results of autopsies, the cases being arranged by groups:

CAUSES OF DEATH.

MAMMALS.

Marsupialia: Pneumonia, 2; tuberculosis, 1; peritonitis, 1; abscess in abdomen, 1.

Carnivora: Pneumonia, 1; anemia, 1; septicemia, 1; abscess of jaw, 1.

Rodentia: Pneumonia, 2; enteritis, 1; gastroenteritis, 1.

Edentata: Adenomata, 1.

Primates: Tuberculosis, 1; pleurisy, 1; enteritis, 1; gastroenteritis, 1; anemia, 1; sarcomatous tumor, 1; accident, 1; not determined, 1.

Artiodactyla: Pneumonia, 3; tuberculosis, 3; congestion of lungs, 1; anemia, 1; septicemia, 2; septic metritis, 1; old age, 1; accident, 2.

Perissodactyla: Anesthetic, during operation, 1.

BIRDS.

Ciconiiformes: Tuberculosis, 1; not determined, 1; no cause found, 1.

Anseriformes: Tuberculosis, 3; enteritis, 4; ptomaine poisoning, 1; septicemia, 1; necrosis of cæcum, 1; hemorrhage, 2; parasitism, 1; accident, 1; not determined, 2.

Falconiformes: Tuberculosis, 1; aspergillosis, 1; not determined, 1.

Galliformes: Aspergillosis, 1; enteritis, 2.

Gruiformes: Tuberculosis, 1; enteritis, 1.

Charadriiformes: Tuberculosis, 4; enteritis, 1; peritonitis, 1.

Cuculiformes: Tuberculosis, 1; enteritis, 2; sarcomatosis, 1; no cause found, 1.

Coraciiformes; Aspergillosis, 1.

Passeriformes: Tuberculosis, 3; enteritis, 2; no cause found, 1.

Such animals, lost by death, as were of particular scientific importance, or needed for exhibition purposes, were transferred to the United States National Museum for preservation. These numbered 15 mammals and 25 birds.

ANIMALS IN THE COLLECTION JUNE 30, 1919.

MAMMALS.

MARSUPIALIA.	
Virginia opossum (*Didelphis virginiana*)	9
Tasmanian devil (*Sarcophilus harrisii*)	2
Phalanger (*Trichosurus vulpecula*)	3
Dusky phalanger (*Trichosurus fuliginosus*)	5
Brush-tailed rock kangaroo (*Petrogale penicillata*)	4
Great gray kangaroo (*Macropus giganteus*)	8
Red kangaroo (*Macropus rufus*)	9
Kangaroo Island kangaroo (*Macropus melanops*)	2
Wallaroo (*Macropus robustus*)	1
Black-tailed wallaby (*Macropus ualabatus*)	1
Rufous-bellied wallaby (*Macropus billardierii*)	4
Parma wallaby (*Macropus parma*)	1
Wombat (*Phascolomys mitchelli*)	1
CARNIVORA.	
Kadiak bear (*Ursus middendorffi*)	1
Alaska Peninsula bear (*Ursus gyas*)	2
Yakutat bear (*Ursus dalli*)	1

Kidder's bear (*Ursus kidderi*)	2
European bear (*Ursus arctos*)	4
Grizzly bear (*Ursus horribilis*)	2
Apache grizzly (*Ursus apache*)	1
Himalayan bear (*Ursus thibetanus*)	1
Black bear (*Ursus americanus*)	3
Kenai black bear (*Ursus americanus perniger*)	1
Cinnamon bear (*Ursus americanus cinnamomum*)	2
Florida bear (*Ursus floridanus*)	2
Glacier bear (*Ursus emmonsii*)	1
Sun bear (*Helarctos malayanus*)	1
Sloth bear (*Melursus ursinus*)	1
Polar bear (*Thalarctos maritimus*)	2
Dingo (*Canis dingo*)	1
Eskimo dog (*Canis familiaris*)	2
Gray wolf (*Canis nubilus*)	10
Southern wolf (*Canis floridanus*)	1
Woodhouse's wolf (*Canis frustror*)	2
Coyote (*Canis latrans*)	3
Red fox (*Vulpes fulva*)	6
Gray fox (*Urocyon cinereoargenteus*)	5
Cacomistle (*Bassariscus astutus*)	2
Raccoon (*Procyon lotor*)	14
Gray coatimundi (*Nasua narica*)	1
Kinkajou (*Potos flavus*)	2
Ferret (*Mustela furo*)	1
Tayra (*Tayra barbara*)	1
Skunk (*Mephitis nigra*)	1
American badger (*Taxidea taxus*)	3
European badger (*Meles meles*)	2
Florida otter (*Lutra canadensis vaga*)	4
African civet (*Viverra civetta*)	1
Genet (*Genetta genetta*)	1
Spotted hyena (*Crocuta crocuta*)	1
Brown hyena (*Hyæna brunnea*)	1
Striped hyena (*Hyæna hyæna*)	2
African cheetah (*Acinonyx jubatus*)	2
Lion (*Felis leo*)	4
Bengal tiger (*Felis tigris*)	1
Manchurian tiger (*Felis tigris longipilis*)	2
Leopard (*Felis pardus*)	1
East African leopard (*Felis pardus suahelica*)	1
Jaguar (*Felis onca*)	1
Mexican puma (*Felis azteca*)	3
Mountain lion (*Felis hippolestes*)	3
Canada lynx (*Lynx canadensis*)	2
Bay lynx (*Lynx ruffus*)	5
California lynx (*Lynx californicus*)	1
Banded lynx (*Lynx fasciatus*)	1

PINNIPEDIA.

California sea-lion (*Zalophus californianus*)	2
Harbor seal (*Phoca vitulina*)	1

RODENTIA.

Woodchuck (*Marmota monax*)	3
Dusky marmot (*Marmota flaviventris obscura*)	1
Prairie-dog (*Cynomys ludovicianus*)	12
Fox squirrel (*Sciurus niger*)	2
Albino squirrel (*Sciurus carolinensis*)	2
American beaver (*Castor canadensis*)	2
Crested porcupine (*Hystrix cristata*)	1
Yellow-haired porcupine (*Erethizon epixanthum*)	2
Coypu (*Myocastor coypus*)	7
Paca (*Cuniculus paca*)	3
Mexican agouti (*Dasyprocta mexicana*)	1
Azara's agouti (*Dasyprocta azaræ*)	2
Crested agouti (*Dasyprocta cristata*)	2
Viscacha (*Lagostomus maximus*)	1
Patagonian cavy (*Dolichotis patagonica*)	1
Peruvian guinea pig (*Cavia tschudii pallidior*)	4
Guinea pig (*Cavia porcellus*)	23
Capybara (*Hydrochærus hydrochæris*)	1

LAGOMORPHA.

Domestic rabbit (*Oryctolagus cuniculus*)	28

PRIMATES.

Gray spider monkey (*Ateles geoffroyi*)	2
White-throated capuchin (*Cebus capucinus*)	2
Margarita capuchin (*Cebus margaritæ*)	1
Chacma (*Papio porcarius*)	1
Hamadryas baboon (*Papio hamadryas*)	2
Mandrill (*Papio sphinx*)	1
Drill (*Papio leucophæus*)	1
Moor macaque (*Cynopithecus maurus*)	1
Brown macaque (*Macaca speciosa*)	2
Japanese monkey (*Macaca fuscata*)	2
Burmese macaque (*Macaca andamanensis*)	1
Pig-tailed monkey (*Macaca nemestrina*)	1
Rhesus monkey (*Macaca rhesus*)	28
Bonnet monkey (*Macaca sinica*)	1
Javan macaque (*Macaca mordax*)	1
Philippine macaque (*Macaca syrichta*)	1
Sooty mangabey (*Cercocebus fuliginosus*)	2
Green guenon (*Lasiopyga callitrichus*)	1
Vervet guenon (*Lasiopyga pygerythra*)	2
Mona (*Lasiopyga mona*)	3
Roloway guenon (*Lasiopyga roloway*)	1
Patas monkey (*Erythrocebus patas*)	1
Chimpanzee (*Pan troglodytes*)	1

ARTIODACTYLA.

Wild boar (*Sus scrofa*)	1
Wart-hog (*Phacochærus æthiopicus*)	2
Hippopotamus (*Hippopotamus amphibius*)	2
Bactrian camel (*Camelus bactrianus*)	2
Arabian camel (*Camelus dromedarius*)	2
Guanaco (*Lama huanachus*)	4
Llama (*Lama glama*)	11
Alpaca (*Lama pacos*)	1
Vicuña (*Lama vicugna*)	1
Fallow deer (*Dama dama*)	3

ɛr (*Axis axis*)	6
·r (*Hyelaphus porcinus*)	6
(*Rusa unicolor*)	2
.eer (*Rusa philippinus*)	1
;ha (*Rucervus duvaucelii*)	10
e deer (*Sika nippon*)	12
r (*Cervus elaphus*)	18
r deer (*Cervus hanglu*)	6
deer (*Cervus xanthopygus*)	6
n elk (*Cervus canadensis*)	7
ı deer (*Odocoileus virginianus*)	15
·er (*Odocoileus hemionus*)	8
ıiled* deer (*Odocoileus colum- s*)	4
orned antelope (*Antilocapra cana*)	2
(*Damaliscus albifrons*)	1
ailed gnu (*Connochætes gnou*)	1
water-buck (*Kobus defassa*)	1
antelope (*Antilope cervicapra*)	7
(*Boselaphus tragocamelus*)	3
'rican eland (*Taurotragus oryx stonii*)	3
Iemitragus jemlahicus)	3
(*Ammotragus lervia*)	1

Rocky Mountain sheep (*Ovis canadensis*)	7
Arizona mountain sheep (*Ovis canadensis gaillardi*)	1
Barbados sheep (*Ovis aries*)	5
Zebu (*Bos indicus*)	1
Yak (*Poëphagus grunniens*)	5
American bison (*Bison bison*)	28
Indian buffalo (*Bubalus bubalis*)	2

PERISSODACTYLA.

Brazilian tapir (*Tapirus terrestris*)	2
Mongolian horse (*Equus przewalskii*)	1
Grant's zebra (*Equus burchelli granti*)	1
Grevy's zebra (*Equus grevyi*)	2
Zebra-horse hybrid (*Equus grevyi-caballus*)	1
Zebra-ass hybrid (*Equus grevyi-asinus*)	1

PROBOSCIDEA.

Abyssinian elephant (*Loxodonta africana oxyotis*)	1
Sumatran elephant (*Elephas sumatranus*)	2

BIRDS.

RATITÆ.

African ostrich (*Struthio aus-)*	4
ınd ostrich (*Struthio molybdo- es*)	1
Rhea americana)	2
Dromiceius novæhollandiæ)	2

CICONIIFORMES.

ın white pelican (*Pelecanus rorhynchos*)	9
ın white pelican (*Pelecanus otalus*)	2
pelican (*Pelecanus roseus*)	2
lan pelican (*Pelecanus con- latus*)	2
pelican (*Pelecanus occiden-*	8
cormorant (*Phalacrocorax us floridanus*)	18
white heron (*Ardea occiden-*	1
ılue heron (*Ardea herodias*)	1
heron (*Ardea goliath*)	1
egret (*Egretta candidissima*)	1
rowned night heron (*Nycti- nycticorax nævius*)	27
(*Cochlearius cochlearius*)	2
ıtork (*Ciconia ciconia*)	3
tork (*Ciconia nigra*)	1
ıecked ibis (*Carphibis spinicol-*	1
ibis (*Threskiornis æthiopicus*)	3
bis (*Guara alba*)	10
ibis (*Guara rubra*)	2
spoonbill (*Ajaia ajaja*)	2
ın flamingo (*Phœnicopterus s*)	1

ANSERIFORMES.

Black-necked screamer (*Chauna torquata*)	1
Mallard (*Anas platyrhynchos*)	17
East Indian black duck (*Anas platyrhynchos var.*)	8
Black duck (*Anas rubripes*)	21
Gadwall (*Chaulelasmus streperus*)	1
European widgeon (*Mareca penelope*)	10
Baldpate (*Mareca americana*)	7
Green-winged teal (*Nettion carolinense*)	9
European teal (*Nettion crecca*)	10
Blue-winged teal (*Querquedula discors*)	6
Garganey (*Querquedula querquedula*)	1
Cinnamon teal (*Querquedula cyanoptera*)	1
Ruddy sheldrake (*Casarca ferruginea*)	1
Pintail (*Dafila acuta*)	8
Wood duck (*Aix sponsa*)	14
Mandarin duck (*Dendronessa galericulata*)	21
Canvas-back (*Marila valisineria*)	2
Redhead (*Marila americana*)	7
Lesser scaup duck (*Marila affinis*)	6
Ring-necked duck (*Marila collaris*)	1
Rosy-billed pochard (*Metopiana peposaca*)	1
Snow goose (*Chen hyperboreus*)	3
Greater snow goose (*Chen hyperboreus nivalis*)	2
Blue goose (*Chen cærulescens*)	6
White-fronted goose (*Anser albifrons*)	3
American white-fronted goose (*Anser albifrons gambeli*)	3
Bar-headed goose (*Eulabeia indicus*)	1
Canada goose (*Branta canadensis*)	26

Hutchins's goose (*Branta canadensis hutchinsii*)	5
Cackling goose (*Branta canadensis minima*)	2
Brant (*Branta bernicla glaucogastra*)	8
Barnacle goose (*Branta leucopsis*)	8
Spur-winged goose (*Plectropterus gambensis*)	3
Black-bellied tree duck (*Dendrocygna autumnalis*)	6
White-faced tree duck (*Dendrocygna viduata*)	8
Coscoroba (*Coscoroba candida*)	1
Mute swan (*Cygnus gibbus*)	6
Whistling swan (*Olor columbianus*)	2
Trumpeter swan (*Olor buccinator*)	1
Black swan (*Chenopis atrata*)	8

FALCONIFORMES.

South American condor (*Vultur gryphus*)	1
California condor (*Gymnogyps californianus*)	8
Turkey vulture (*Cathartes aura*)	4
Black vulture (*Coragyps urubu*)	2
King vulture (*Sarcoramphus papa*)	2
Secretary bird (*Sagittarius serpentarius*)	1
Griffon vulture (*Gyps fulvus*)	2
Cinereous vulture (*Aegypius monachus*)	2
Caracara (*Polyborus cheriway*)	8
Wedge-tailed eagle (*Uroaëtus audax*)	2
Golden eagle (*Aquila chrysaëtos*)	2
Bald eagle (*Haliæetus leucocephalus*)	12
Alaskan bald eagle (*Haliæetus leucocephalus alascanus*)	1
Sparrow hawk (*Falco sparverius*)	1
Red-tailed hawk (*Buteo borealis*)	2
Swainson's hawk (*Buteo swainsoni*)	1

GALLIFORMES.

Mexican curassow (*Crax globicera*)	2
Daubenton's curassow (*Crax daubentoni*)	1
Chicken-guinea hybrid (*Gallus* × *Numida*)	1
Wild turkey (*Meleagris gallopavo silvestris*)	2
Peafowl (*Pavo cristatus*)	43
Peacock pheasant (*Polyplectron bicalcaratum*)	1
Silver pheasant (*Gennæus nycthemerus*)	1
Lady Amherst's pheasant (*Chrysolophus amherstiæ*)	1
Golden pheasant (*Chrysolophus pictus*)	9
Bobwhite (*Colinus virginianus*)	2
Scaled quail (*Callipepla squamata*)	4
Gambel's quail (*Lophortyx gambelii*)	2
Valley quail (*Lophortyx californica vallicola*)	8

GRUIFORMES.

American coot (*Fulica americana*)	9
South Island weka rail (*Ocydromus australis*)	8
Short-winged weka (*Ocydromus brachypterus*)	2
Earl's weka (*Ocydromus earli*)	1
Whooping crane (*Grus americana*)	1
Sandhill crane (*Grus mexicana*)	5
White-necked crane (*Grus leucauchen*)	1
Indian white crane (*Grus leucogeranus*)	1
Lilford's crane (*Grus lilfordi*)	2
Australian crane (*Grus rubicunda*)	1
Demoiselle crane (*Anthropoides virgo*)	8
Crowned crane (*Balearica pavonina*)	2
Cariama (*Cariama cristata*)	1

CHARADRIIFORMES.

Great black-backed gull (*Larus marinus*)	1
Herring gull (*Larus argentatus*)	1
Laughing gull (*Larus atricilla*)	2
Australian crested pigeon (*Ocyphaps lophotes*)	3
Bronze-wing pigeon (*Phaps chalcoptera*)	1
Wonga-wonga pigeon (*Leucosarcia picata*)	9
Red-billed pigeon (*Chloroenas flavirostris*)	1
White-winged dove (*Melopelia asiatica*)	1
Mourning dove (*Zenaidura macroura*)	1
Diamond dove (*Geopelia cuneata*)	2
Zebra dove (*Geopelia striata*)	10
Bar-shouldered dove (*Geopelia humeralis*)	2
Inca dove (*Scardafella inca*)	3
Blue-headed quail-dove (*Starnœnas cyanocephala*)	1
Ringed turtle-dove (*Streptopelia risoria*)	15

PSITTACIFORMES.

Grass paroquet (*Melopsittacus undulatus*)	2
Black-tailed paroquet (*Polytelis melanura*)	1
Lesser vasa parrot (*Coracopsis nigra*)	1
Gray parrot (*Psittacus erithacus*)	2
Haitian paroquet (*Aratinga chloroptera*)	1
Blue-winged parrotlet (*Psittacula passerina*)	1
Cuban parrot (*Amazona leucocephala*)	6
Isle of Pines parrot (*Amazona leucocephala palmarum*)	1
Yellow-shouldered parrot (*Amazona barbadensis*)	1
Festive parrot (*Amazona festiva*)	1
White-fronted parrot (*Amazona albifrons*)	1
Orange-winged parrot (*Amazona amazonica*)	1
Santo Domingo parrot (*Amazona ventralis*)	2
Yellow-headed parrot (*Amazona ochrocephala*)	2

d parrot (*Amazona auro-*	2
ow-head parrot (*Amazona*	10
ked parrot (*Amazona au-*)	1
parrot (*Rhynchopsitta ncha*)	2
e macaw (*Ara chlorop-*	2
e-and-yellow macaw (*Ara*	7
llow macaw (*Ara arara-*	1
sted cockatoo (*Cacatoes*	2
crested cockatoo (*Cacatoes sis*)	1
atoo (*Cacatoes alba*)	2
's cockatoo (*Cacatoes lead-*	1
cockatoo (*Cacatoes gym-*	8
ockatoo (*Cacatoes roseica-*	11
r notabilis)	5

CORACIIFORMES.

fisher (*Dacelo gigas*)	2
d toucan (*Ramphastos pis- revicarinatus*)	1
squed hornbill (*Dichoceros*	1
l (*Strix varia*)	7
l (*Otus asio*)	6
ed owl (*Bubo virginianus*)	4
orned owl (*Bubo virginianus s*)	1
barn owl (*Tyto perlata la*)	2

PASSERIFORMES.

hill-tit (*Liothrix luteus*)	3
eted laughing-thrush (*Gar- ctoralis*)	4
Hermit thrush (*Hylocichla guttata pallasi*)	1
Australian gray jumper (*Struthidea cinerea*)	1
Green jay (*Xanthoura luxuosa*)	1
Australian crow (*Corvus coronoides*)	1
Fish crow (*Corvus ossifragus*)	1
European raven (*Corvus corax*)	1
Napolean weaver (*Pyromelana afra*)	2
Madagascar weaver (*Foudia madagascariensis*)	4
Paradise widow bird (*Steganura paradisea*)	1
Cut-throat finch (*Amadina fasciata*)	1
Zebra finch (*Tæniopygia castanotis*)	6
Black-faced Gouldian finch (*Poëphila gouldiæ*)	5
Red-faced Gouldian finch (*Poëphila mirabilis*)	1
Strawberry finch (*Amandava amandava*)	8
Black-headed finch (*Munia atricapilla*)	1
Nutmeg finch (*Munia punctulata*)	10
Java finch (*Munia oryzivora*)	10
White Java finch (*Munia oryzivora*)	1
Vera Cruz red-wing (*Agelaius phœniceus richmondi*)	2
Crimson tanager (*Ramphocelus dimidiatus*)	8
Blue tanager (*Thraupis cana*)	8
Thick-billed euphonia (*Tanagra crassirostris*)	8
Song sparrow (*Melospiza melodia*)	1
Slate-colored junco (*Junco hyemalis*)	4
White-throated sparrow (*Zonotrichia albicollis*)	8
Saffron finch (*Sicalis flaveola*)	8
Canary (*Serinus canarius*)	4
Green singing finch (*Serinus icterus*)	1
European chaffinch (*Fringilla cœlebs*)	1
Red-crested cardinal (*Paroaria cucullata*)	1
Cardinal (*Cardinalis cardinalis*)	8

REPTILES.

(*Alligator mississipiensis*)	28
nd iguana (*Cyclura stejne-*	1
ter (*Heloderma suspectum*)	7
ed lizard (*Tiliqua scin-*	1
(*Anolis carolinensis*)	1
toad (*Phrynosoma cornu-*	2
on (*Python molurus*)	8
python (*Python spilotes*)	1
(*Eunectes murinus*)	2
rictor (*Constrictor constric-*	6
snake (*Abastor erythrogram-*	1
Blacksnake (*Coluber constrictor*)	1
Chicken snake (*Elaphe quadrivittata*)	1
Water snake (*Natrix sipedon*)	5
Garter snake (*Thamnophis sirtalis*)	1
Moccasin (*Agkistrodon piscivorus*)	1
Ground rattler (*Sistrurus miliarius*)	1
Duncan Island tortoise (*Testudo ephippium*)	1
Albemarle Island tortoise (*Testudo vicina*)	1
Gopher tortoise (*Gopherus polyphemus*)	2
Snapping turtle (*Chelydra serpentina*)	2
Cooter (*Pseudemys scripta*)	1
Florida terrapin (*Pseudemys floridana*)	1

STATEMENT OF THE COLLECTION.

ACCESSIONS DURING THE YEAR.

Presented:		
Mammals	19	
Birds	25	
Reptiles	30	
		74
Born and hatched in the National Zoological Park:		
Mammals	76	
Birds	83	
		159
Received in exchange:		
Mammals	11	
Birds	70	
		81
Purchased:		
Mammals	9	
Birds	27	
Reptiles	2	
		38
Transferred from other Government departments:		
Mammals	2	
Birds	1	
Reptiles	6	
		9
Captured in National Zoological Park:		
Birds		10
Deposited:		
Mammals	2	
Birds	7	
Reptiles	10	
		19
Total accessions		390

SUMMARY.

Animals on hand July 1, 1918	1,247
Accessions during the year	390
	1,637
Deduct loss (by exchange, death, and return of animals on deposit)	301
Animals on hand June 30, 1919	1,336

Class.	Species.	Individuals.
Mammals	156	528
Birds	190	737
Reptiles	23	71
Total	369	1,336

VISITORS.

The record for number of visitors during a single fiscal year has again been exceeded. The number of people admitted to the park, as determined by count and estimate, was 1,964,715, a daily average of 5,383. The greatest number in any one month was 355,651, in April, 1919, an average per day of 11,855. On March 23, 1919, there were 70,000 visitors; on Sunday, April 6, 1919, 85,000; and on Easter Monday, April 21, 1919, 55,359 (actual count at gates).

The attendance by months was as follows: In 1918: July, 160,600; August, 116,200; September, 154,600; October, 114,500; November, 91,400; December, 93,424. In 1919: January, 101,625; February, 115,150; March, 242,650; April, 355,651; May, 220,700; June, 198,215.

The record for attendance for the year ending June 30, 1918, which exceeded the previous record year (1916) by 436,117, was beaten by 371,488. Following are the attendance records for the past eight years:

1912	542,738	1916	1,157,110
1913	633,526	1917	1,106,900
1914	733,277	1918	1,593,227
1915	794,530	1919	1,964,715

The park continues in popularity as a means of instruction to schools and classes, as well as a resort for out-of-doors gatherings for large picnic parties, where the usual woodland surroundings and pleasures may be supplemented by visits to the zoological collections. Ninety-eight such schools and classes visited the park in 1919, with a total of 6,169 individuals. These came not only from the District of Columbia, Maryland, and Virginia, but from the more distant States of Pennsylvania, New Jersey, Massachusetts, and Ohio. The American Society of Mammalogists held an informal meeting with luncheon at the park on April 4, 1919, with 75 members in attendance.

IMPROVEMENTS.

Exterior cages for leopards, jaguars, and hyenas, on the east side of the north wing of the lion house, were nearly completed before the close of the year. The cages are seven in number, 24 feet deep, and 74 feet long over all. The cost, including material and the labor of regular employees, was $3,410. This long-desired improvement adds greatly to the appearance of the building and to the comfort of the animals.

A perforated radial brick chimney 80 feet in height above the concrete foundation and 42 inches interior diameter at the top was built at the central heating plant to replace the old and worn-out metal stack. The concrete base was constructed by the park workmen and the chimney by contract, at a total cost of $2,647.

A public toilet 13 by 28 feet 8 inches was constructed near the Connecticut Avenue entrance. Some of the materials for this work were purchased from the 1918 appropriation, and the labor was all by regular employees of the park. The cost of this structure, including labor, was $1,200.

The smaller elephant house, roofs of the larger elephant house and restaurant building, outdoor lion and tiger cages, outdoor cages on east and west sides of monkey house, and other fences and inclosures were painted, at a total cost of $1,586. The materials, amounting to $475, were furnished by the park. The contracts for labor totaled $1,111.

The creek-side drive from Klingle Ford to the crossroads and the main road from the concrete bridge to the concourse were broken up and rebuilt, the creek-side drive from crossroads to the stone bridge was resurfaced, and roads in other parts of the park were repaired and resurfaced where necessary. The cost of materials for road work was $1,295, and the labor, including regular park employees and temporary men, amounted to $1,475.50.

Other minor improvements and repairs completed during the year include a new fence around the nursery and gardens, concrete steps to replace old stone steps leading from wolf dens up to bear yard steps, cement stairway from Cathedral Avenue leading down into park under the Calvert Street Bridge, repair of walks leading in from Adams Mill gate, repair of bridle paths, drainage for zebra house and yards, paving in zebra yards, a new policeman's box at Klingle gate. The old wooden ties of the fence of the large elephant yard were replaced by an iron fence to match the permanent sections already constructed. A number of large wire receptacles for rubbish and 100 new park benches were provided.

IMPORTANT NEEDS.

Alteration of the western boundary.—By an act approved June 23, 1913, Congress appropriated $107,200 for the purchase of certain lots and parcels of land between the western boundary of the National Zoological Park and Connecticut Avenue, from Cathedral Avenue to Klingle Road, this land, together with the included highways, to become a part of the park. The appropriation was not a continuing one and lapsed at the end of the following fiscal year, before proceedings for the purchase of the land were completed. Items for the reappropriation of this sum and for the additional amount necessary to meet the figures fixed by the court in proceedings of condemnation were submitted to Congress in the following years, but were not favorably considered. Following a suggestion made by the chairman of the Appropriations Committee at the hearing on the bill for 1919, the item for the purchase of this land was revised in the estimate for 1920 to include only a portion of the property originally appropriated for in 1913. The land asked for in the estimates submitted for 1920 and, failing approval, again included in estimates for 1921, includes 250 feet each side of Jewett Street, fronting on Connecticut Avenue, and all of the land inside the unnamed road between Connecticut Avenue and the park, excepting one lot. This, with all of Jewett Street, and the included portion of the unnamed street, would satisfy all the important needs of the park and give a frontage of over 600 feet on Connecticut Avenue. One of the principal entrances to the park will always be from Connecticut Avenue and the importance of a frontage on that thoroughfare at and bordering the gate can not be overestimated. The necessary land can now be purchased for about $80,000, and should be acquired before it is too late.

Alteration of the southeastern boundary.—The question of the purchase of a narrow strip of land between the park and Adams Mill Road, from Clydesdale Place to Ontario Road, still in private ownership, is now brought forcibly to our attention because of improvements being made at that point by the District government. As this newly developed section of Adams Mill Road will doubtless become one of the most used highways connecting the park systems, and as the privately owned strip is within a few feet of the Adams Mill Road entrance to the park, the need for public ownership can not be

estioned. The amount required is comparatively small and the
rchase of the land should not long be delayed, as the bordering
ad is soon to be opened, and the ownership of the narrow strip by
e Government and its incorporation within the park is of very
eat interest to the public.

Restaurant.—One of the most urgent needs of the park is a suitable
staurant. The present refreshment stand is entirely inadequate and
in a very bad state of repair. On any of the days of reasonably
rge attendance the public can be only poorly served and the facili-
es of the stand are overtaxed. It is believed that a suitable building,
n the present site, 50 by 100 feet in size, and of two floors, one open-
g onto the lower slope to the west, would meet the requirements.
uch a building, properly equipped and under first-class manage-
ent, would be greatly appreciated by the constantly increasing num-
er of visitors to the park.

Grading banks and filling ravines.—The work of further cutting
way the irregular hill in the center of the western part of the park
nd the filling in of a near-by ravine, commenced three years ago but
iscontinued for lack of funds, should be completed as soon as prac-
icable. Level spaces for yards and inclosures are very much needed,
nd the work as left makes an unsightly and unfinished looking
lace in one of the most conspicuous points in the park, bordering on
he main road. Completion of the work will level nearly 70,000
quare feet of ground which is now of little use, make available a
urther 25,000 square feet of ground at the ravine, and eliminate a
angerous curve in the automobile road.

Purchase of animals.—A sufficient sum for the purchase and trans-
ortation of animals has never been available and is greatly to be
esired, so that the park may take advantage from time to time of
pportunities to obtain rare and conspicuous animals not before
xhibited.

Aviary building.—The need of a new house for the exhibition of
irds continues to become more urgent from year to year. The old
uilding is rapidly becoming unfit for use and the public aisles are
ntirely too narrow for the crowds of people who now visit the park.

The cost of maintenance during the past year has reached a sum
reater than ever before. Owing to the increased cost of almost every
em, the amount required for food for animals was $33,149, and
epairs and new improvements are similarly expensive. It is urgent,
herefore, if there is to be any expenditure for improvements or for
ecessary repairs that an increase be made in the general appropria-
ion for the expenses of the park.

Respectfully submitted.

N. Hollister, *Superintendent.*

Dr. Charles D. Walcott,
Secretary Smithsonian Institution,
Washington, D. C.

APPENDIX 5.

REPORT ON THE ASTROPHYSICAL OBSERVATORY.

SIR: The Astrophysical Observatory was conducted under the following passage of the sundry civil act approved July 1, 1918:

> Astrophysical Observatory: For maintenance of Astrophysical Observatory, under the direction of the Smithsonian Institution, including assistants, purchase of necessary books and periodicals, apparatus, making necessary observations in high altitudes, repairs and alterations of buildings, and miscellaneous expenses, $13,000.

The observatory occupies a number of frame structures within an inclosure of about 16,000 square feet south of the Smithsonian administration building at Washington, and also a cement observing station and frame cottage for observers on a plot of 10,000 square feet leased from the Carnegie Solar Observatory, on Mount Wilson, Calif.

The present value of the buildings and equipment is estimated at $50,000. This estimate contemplates the cost required to replace the outfit for the purpose of the investigations.

WORK OF THE YEAR.

At Washington.—As usual, the computation of the results of solar constant observations made at Mount Wilson, Calif., has gone on steadily at Washington, except as interrupted by the furlough of the computer, Miss Graves, for work in France, as mentioned under the subheading "Personnel." After the services of other computers had been obtained the work went on rapidly and is now nearly up to date.

The preparation of Volume IV of the Annals of the Astrophysical Observatory, including results of measurements from the year 1913, has been occupying the attention of the director to a very great extent since February.

In consideration of the fact that the total eclipse of the sun of May 29, 1919, was visible in La Paz, Bolivia, which is not very far from the Smithsonian solar-constant observing station in Calama, Chile, and in further consideration of the fact that the Argentine Government is using the daily telegraphic reports of the solar observations at Calama for forecasting purposes; and, further, that certain conditions had arisen at Calama which would seem to require the personal investigation of the writer, it appeared necessary to make an expedition to South America to attend to these several matters. The preparation for the eclipse work occupied some time of the director and of the instrument maker.

Several investigations relating to the war, a brief note of which was mentioned in last year's report, were continued during the fiscal year.

The painstaking and valuable work which Mr. Fowle has been doing on the revision of the Smithsonian physical tables should receive some notice, although this work is being done by him outside of his regular hours of service for the observatory. This book has passed through a number of editions under his editorship and has attained an enviable reputation in this country and abroad for the accuracy and fullness of its contents. The new edition, which is now in press, has received unusual attention on his part, and very valuable cooperation from the various scientific departments of the Government and of outside individuals in colleges and industrial corporations and elsewhere, and will be a great advance over any of the former editions.

In connection with work of the Observatory, we have long wished to determine the solar constant of radiation by a method which does not involve the assumption that the transparency of the atmosphere is constant over the two or three hours required for the determination of it by the usual spectrobolometric method. We hoped that, seeing that the sky is brighter when the transparency is less, an observation by the pyranometer, or some other more suitable instrument, of the brightness of the sky in the neighborhood of the sun, combined with the usual measurements of the pyrheliometer and perhaps of the spectrobolometer, but only at one period of time, might be sufficient to determine the solar constant by a satisfactory empirical process based upon spectrobolometric investigations of former years. In the hope of getting an instrument more satisfactory than the pyranometer for this special work, a new design comprising essentially two disks, one of which is shined upon through a graduated aperture by the sun and the other of which is exposed to the small region of sky desired and both connected by thermoelectric junction so as to enable equality of temperature of the two disks to be adjusted, was devised and partly constructed at Washington. It was sent in a letter to Calama, Chile, and was finished by the director during his visit in Chile and is now in satisfactory operation, although it has not yet supplanted the pyranometer for the purpose in question.

Another problem which requires a new kind of apparatus is the measurement of nocturnal radiation such as the earth sends out to space. This investigation is exceptionally difficult, for it involves a range of wave length from 5 microns to 50 microns. There is no surface either of blackened metal or other substance which is fully absorbing to the rays throughout this whole extent, and furthermore there is no optical medium known by means of which the properties of the rays beyond about 17 microns, where rock salt ceases to be transparent, may be investigated. For the purpose of determining nocturnal radiation it seems absolutely indispensible that there should be devised an instrument based upon the principle of the perfect radiator or "absolutely black body." This is a very difficult thing because not only does the instrument have to be exposed to the full hemisphere of 180° of solid angle, but also the radiation to be observed is small in amount, little more than the tenth part of the radiation of the sun. Seeing that the "black body," so called, requires to be a hollow chamber, large with respect to the aperture through which the rays enter, the rise of temperature of its walls which must be measured is extremely small. After much consultation, Mr. Aldrich and the director decided upon a design of a new instrument for this purpose. This was constructed in the spring of 1919, and is now in use on Mount Wilson. Whether it will prove to be satisfactory or not remains a question.

In order to investigate the rays beyond the wave length where rock salt becomes opaque a great many measurements have been made by Mr. Aldrich, as mentioned in the last report, to attempt to find some substance transmissible to such rays. The best substance found appeared to be potassium iodide. It usually occurs as crystals no larger than a buckshot. Accordingly, in order to make any satisfactory progress it was necessary to procure larger crystals, preferably large enough to make a prism of five or more centimeters on an edge, but at least so large that such a prism could be built up by cementing parts of it together. Experiments had been made at the General Electric Co. for producing large crystals needed in war operations, and they very kindly undertook to try to grow potassium iodide crystals also. A number of crystals, very satisfactorily clear, have been produced by them as large as 2 centimeters on each edge, and from a sufficient number of these the prism required for going on with this long wave length work may probably be formed.

Mr. Aldrich spent a long time on the development and testing of an apparatus for determining the constant of the fourth power radiation formula ordinarily called σ. This is a very difficult research. The quantity is already certainly known within 5 per cent and many physicists would believe even closer than this. Many researches have been made upon it and in order to do a piece of work worth while it is necessary to show that it is certainly accurate to 1 per cent. After many experiments it was found that this degree of certainty could not be secured with the apparatus which Mr. Aldrich and the director had designed and which Mr. Kramer, instrument maker, had constructed, and so the work was given er for a time.

At Mount Wilson.—Mr. Aldrich continued the observations of the ar constant of radiation until the middle of October, 1918, and urned to continue them early in June, 1919. In September of 18 he made a very interesting observation in cooperation with the my Balloon School at Arcadia at the foot of Mount Wilson. It nsisted in arranging a pyranometer to be hung below the basket a captive balloon, which could be raised above the level of the eat horizontal layer of fog which often covers the San Gabriel d other valleys in the neighborhood of Los Angeles in a sheet any miles in extent. On this occasion the layer of fog extended om 1,000 feet of altitude to 2,500 feet. The balloon was raised to out 200 feet above the layer. An officer of the balloon school posed the apparatus under the balloon to the radiation from the eet of fog, while Mr. Aldrich, on the ground, observed the deflec- ons of the galvanometer. The galvanometer was connected to the ranometer by a pair of wires about a half mile long. Simul- neously observations were made on Mount Wilson with the pyrheli- neter to determine the exact character of the day, and on other days similar character Mr. Aldrich exposed the pyranometer to the diation of the sun and sky combined. Thus knowing the radiation flected from the sheet of fog, and knowing the radiation on a similar y coming down from the sun and sky, he was able to determine e reflecting power of a great layer of fog. This observation is ry useful for the study of the relations of the temperature of the rth to radiation. The result of the experiments, which were con- nued for several hours without interruption, was very satisfactory. he final value for the reflecting power of a great horizontal sheet fog was 78 per cent.

The weather on Mount Wilson, in the autumn of 1918, was un- mmonly poor for the solar constant work, as rain fell frequently d a great many clouds came up. Altogether it was the most favorable weather which has been experienced in any observing ason there since it was occupied for solar constant purposes.

SOUTH AMERICAN EXPEDITION.

Several considerations led to the decision to make a small expedi- on to South America in the spring of 1919. The Institution had uipped an observatory at Calama, Chile, to measure the solar con- ant of radiation. The Argentine meteorological service, through chief forecaster, Mr. Clayton, had been determining the effects of e variation of the sun on the temperature and other weather condi- ons of the earth, and had been so much impressed by the value of e solar variation observations for forecasting purposes that they had arranged to receive daily telegraphic reports of the values obtained at Calama, Chile. The director of the observatory at Calama, Mr. Moore, had conceived a feeling that the sky conditions were not as favorable as perhaps might be secured in other parts of South America or elsewhere and feared that it was unwise for the Institution to continue to conduct the operations there. On all of these accounts it seemed necessary for Dr. Abbot to go to South America and deal with these several matters.

In accordance with the sundry civil act, which failed of passage on March 4, 1919, but was approved July 19, 1919, the following authorization was secured:

> The unexpended balance of the appropriation "For observation of the total eclipse of the sun of June 8, 1918, and so forth," is reappropriated and made available for observation of the total eclipse of the sun of May 28, 1919, visible in Bolivia.

The two 11-foot focus 3-inch cameras employed by the Smithsonian observers at Wadesboro, N. C., in 1900, and again by Mr. Aldrich in 1918, were equipped with a collapsible tube and other mechanism, so that they could be speedily arranged with equatorial clock-driven motion to photograph an eclipse in South America. Mr. Moore, at Calama, was instructed to arrange to join Dr. Abbot with the pyranometer employed there, so as to observe the degree of darkening of the sky and sun as the eclipse progressed. Arrived at Calama, the apparatus was repacked for use in the field, and Messrs. Moore and Abbot proceeded to La Paz, Bolivia, where, owing to the kindness shown by Mr. Babbage, of the railroad, arrangements were made to observe close to the railroad station at El Alto, situated about 1,500 feet above La Paz, at an altitude of about 14,000 feet above sea level. The day of the eclipse, May 29, proved very favorable. The sky was entirely cloudless in the neighborhood of the sun for several hours. Mr. Moore had observed during the day before and during the night, and continued his observations each minute throughout the totality and the succeeding partial phase up until about two hours after sunrise. Dr. Abbot had set up and adjusted the photographic telescope with Mr. Moore's aid, and except for one defect it operated perfectly. This was that since the eclipse took place so very early in the morning, only 20 minutes after sunrise, the rate of motion of the sun above the horizon was not uniform with that which would occur in the middle of the day, owing to refraction. The apparatus had only been set up the day before, so that there was not time to work out this matter to know exactly how to rate the clock at the moment of eclipse. Preliminary observations of May 28 had indicated that the clockwork ran a little too slow. During the day it was speeded up a little, but on the day of the eclipse it proved to be a trifle too fast, so that the moon appears to be elliptical rather than perfectly round, as it should have been, except for the slight motion of the moon relative to the sun during the eclipse. However, this defect is not very noticeable, and excellent photographs were obtained with both lenses, but particularly with the one which was exposed 1 minute and 30 seconds rather than the other, which was exposed 2¾ minutes.

The phenomenon was uncommonly grand, far more so than appears in the photograph. The sun had risen over a snow-capped mountain, about 20,000 feet high. It rose over half eclipsed, with the crescent horns pointing upward from the horizon equally. In 20 minutes totality occurred, and there shot out over 20 fine sharp coronal rays, greatest elongated along the equatorial zone, but also visible to great distances from the poles. At the lower limb there was a very large flaming red prominence, which at that time rose to perhaps a quarter of the solar radius, and had a very long side extension, after the manner of a hook. The same prominence was observed by spectroscopic methods in the United States, at the great observatories, and was one of the finest prominences ever photographed. It is very interesting and fortunate that the early history of this prominence was enriched by the photograph made at La Paz so very early in the morning.

Taking the whole phenomenon together, the snow-covered mountain, the brilliant sky at that great altitude of 14,000 feet, the very numerous and long coronal streamers, and the enormous crimson prominence casting its glow over all, the spectacle was truly glorious, and by far the most impressive of any of the eclipses which have been seen by the writer. It was reported that the Bolivian natives lighted many fires and supplicated the sun to return, after old Inca traditions.

Visit to Argentina.—Immediately after the eclipse Messrs. Moore and Abbot proceeded to La Quiaca in Argentina for the purpose of having a conference there with the director and forecaster of the Argentine meteorological service. Mr. Clayton, the official forecaster, submitted for their inspection results he had obtained during several years in the comparison of the weather of Argentina with the variations of solar radiation reported by the Smithsonian observers at Mount Wilson, Calif., and Calama, Chile, and the results obtained by using the measurements of Calama for the forecasting of the weather in Argentina.

Mr. Clayton says:

> For nearly a year numerical and graphical analyses have been made of the solar variations and of the variations of temperature at 20 selected stations well distributed over Argentina, Chile, and Brazil. These analyses show that each variation in solar radiation has been followed by similar variations of temperature in South America, with a few exceptions that may easily have resulted from errors in the measurements of solar radiation. At Buenos Aires the ratio

> of temperature change to solar change at the time of greatest solar activity was found from the averages of several years to be 1.4 C. for each change of 1 per cent in solar radiation. Since the extreme solar values range about 6 per cent on either side of the mean, there might result departures from the normal at Buenos Aires from this cause of about 8.5 C. The extreme departure from the normal observed at Buenos Aires during the last 18 years has been 11.5 C. The results of these researches have led me to believe that the existing abnormal changes which we call weather have their origin chiefly, if not entirely, in the variation of solar radiation.

Naturally, these results, which are supported by an enormous amount of careful and conscientious computation on the part of the forecasting division of the Argentine meteorological service, are of extreme interest. They point to the great desirability of equipping in different cloudless regions of the world several observatories designed for the measurement of the solar constant of radiation. The chief of the Argentine weather service, Mr. Wiggin, desires very much to take over the South American station of the Smithsonian Institution, to be maintained by the Argentine meteorological service. Tentative arrangements were entered into between Dr. Abbot and Mr. Wiggin for this purpose, which, however, require the further approval of the Argentine Government to become effective. If suitable arrangements for the transfer can be made, it is hoped to employ the funds thereby set loose for the establishment by the Smithsonian Institution of a solar station in Egypt.

From Argentina, Messrs. Moore and Abbot returned immediately to Calama.

Measurements of the Solar Constant of Radiation at Calama, Chile.—When Dr. Abbot reached Calama he found that Messrs. Moore and Abbot had prepared data giving the pyrheliometry, the transparency of the atmosphere for nearly 40 wave lengths, the function $\rho/\rho sc$, and pyranometer values representing the intensity of the radiation of the sky in a zone 15° wide surrounding the sun. All these values were tabulated with solar constant values for 60 days of observation and for each day at periods when the air masses were 2 and 3, respectively.

We have felt very keenly the desirability of devising some method of determining the solar constant of radiation which would be independent of changes in the transparency of the atmosphere during the period of observation. It had been hoped that this might be done in some simple way by the aid of the pyranometer, that instrument which we devised several years ago for the purpose of measuring the brightness of the sky. It is well known that when the sky becomes more hazy the direct beam of the sun is reduced in intensity, but the scattered light of the sky at the same time is increased. Accordingly, it would seem that a pyranometer measurement of the brightness of a limited area of the sky near the sun would furnish an index of the state of the transparency of the atmosphere at the moment of observation, and this combined with the usual observations of the solar intensity at the earth's surface by the pyrheliome- er, and combined further with the determination of the quantity of he aqueous vapor between the observer and sun (which is indicated by the state of the great infra-red absorption bands, ρ and φ) might give the means of estimating the solar radiation outside the atmosphere from observations made at a single instant of time.

With the various data mentioned above as a basis, the writer endeavored to find some method of determining the solar constant of radiation without the necessity of treating the several wave lengths of radiation separately, but after almost a week spent in working over the data, trying to combine them along these lines, the effort had to be abandoned. Mr. Moore had, however, suggested that if we knew the coefficient of atmospheric transmission for all of the individual wave lengths on a given day and had observed with the spectrobolometer and pyrheliometer at air mass 2 or at air mass 3, we could determine the solar constant from these data at once. All simple means having failed to give a satisfactory method, Mr. Moore's suggestion was acted upon, and it was found possible, by noting the value of the function ρ/ρsc and the intensity of the sky light in the neighborhood of the sun, to determine at once the transmission coefficients for all wave lengths. This we do by means of plots in which the data for the 60 days mentioned are employed. These data were used in the following manner:

Taking the value obtained at air mass 2 by the pyranometer for the limited area of sky around the sun, dividing it by the value of ρ/ρsc at the corresponding time, we obtain a function which we may call "F." Plotting values of "F" as abscissæ against values of the transmission coefficients for each measured wave length as ordinates, we obtain about 40 plots. These for the infra-red region of the spectrum are nearly straight lines but they become more and more convex toward the axes of coordinates for the rays of shorter wave lengths. In the 60 days which were available for the investigations the function "F" ranged through values running from 100 to 900 of a certain scale, while the function "a"—that is, the transmission coefficient—ranged only through a very few per cent and for a large portion of the spectrum, including the infra-red region, hardly through more than 1 or 2 per cent. Accordingly great error is allowable in the function "F" without greatly affecting the accuracy of the inference as to the value of the function "a." In short, by means of the function "F" we are able to determine the function "a" for all wave lengths with highly satisfactory accuracy from observations at a single point of time, so that changes of the atmospheric transparency during the period of observation are avoided.

This new method will hereafter be employed by the Smithsonian observers at Calama in combination with the old, not only for air mass 2, but for air mass 3, and they will check one against the other frequently for a considerable period of time until we are abundantly satisfied of the accuracy of the new method of observation. Hitherto the new method has enabled us to save at Calama a number of days of observation which, owing to the obvious changes in transparency of the atmosphere, due to formation or disappearance of clouds, would otherwise have been lost.

So far as we have as yet been able to compare the results by the old and the new methods, they are on the average closely identical. For instance, on July 1 three values of the solar constant were computed: (1) By the old process; (2) from observation at air mass 2: (3) from observations at air mass 3. The results obtained were as follows: 1.948, 1.940, 1.955, all agreeing within less than 1 per cent, and the mean of the results by the new process agreeing identically with the result by the old.

The new process requires but two or three hours of work, where the old required about 15, so that if it continues to appear as satisfactory as now a very great gain in labor will result from it. Not only is this so, but a still greater gain we think will come in accuracy, for we have now eliminated the fruitful source of error, depending on the variability of the atmospheric transparency during the observations.

The new method of determining the solar constant of radiation is not applicable to other stations than Calama without a new series of contemporaneous solar constant determinations by the old method and pyranometer observations at air mass 2 and air mass 3 to use with them. We have not at present available the necessary pyranometer observations at Mount Wilson, but we shall undertake to obtain them at the earliest practicable moment, and hereafter it is probable that the new method of determination will be employed there as well as in South America.

On the whole, the expedition to South America was unexpectedly fruitful. First, satisfactory observations were made of the eclipse, including both photographic observations of the eclipse phenomenon and pyranometer observations of the brightness of the sky during its progress. Second, a very interesting conference was held with the chief and chief forecaster of the Argentine meteorological service, in which they explained their investigations of the application of solar radiation measurements to weather forecasts and indicated their high sense of the value of solar radiation work for weather forecasting. Third, investigations at Calama based upon the observations there indicated a new empirical method of determining the solar constant of radiation, which appears to be equally as accurate as the old and to have the great advantages: (1) That it avoids the assumption of uniformity of atmospheric transparency during the several hours formerly required for observing, and (2) that it diminishes the time required for computing the result from about 15 hours to about 3 hours.

PERSONNEL.

Miss Florence A. Graves, computer, was placed on furlough beginning September 5, 1918, in order that she might take up work in connection with the Red Cross operations in France.

Miss Gladys L. Thurlby reported as assistant computer on December 2, 1918, and Miss Inez A. Ensign reported as computer on February 1, 1919.

SUMMARY.

At Washington, outside of the usual reductions of observations and various pieces of experimental investigation, some connected with the war, others with the study of radiation, but for which, for one reason or another, no definite result can at present be reported, progress has been made with the preparation of a new optical medium, potassium iodide, for the investigation of the rays beyond where rock salt is transmissible, and a new instrument based upon the principle of the perfect radiator or " absolutely black body " has been prepared and is undergoing test for the purpose of measuring nocturnal radiation such as the earth sends out to space.

At Mount Wilson the measurements of the solar constant of radiation have been continued, and a very neat and excellent piece of work has been done by Mr. Aldrich, in cooperation with the Army Balloon School at Arcadia, on the measurement of the reflection of sun and sky radiation from great sheets of clouds, which lead to the result that a fully clouded earth would reflect to space 78 per cent of the radiation of the sun falling upon it.

In South America, a successful expedition by Dr. Abbot observed the total eclipse of the sun on May 29 at La Paz, Bolivia. Good photographs of the phenomenon and also pyranometric observations by Mr. A. F. Moore of the brightness of the sky were obtained during the progress of the eclipse. A conference which is likely to prove of great future value was held by Dr. Abbot with the chief and chief forecaster of the Argentine meteorological service with reference to the employment of solar radiation measurements for weather forecasting. At Calama, Chile, Dr. Abbot, in cooperation with the Smithsonian observers there, Messrs. Moore and Abbot, devised a new method of reducing solar radiation observations so as to determine the solar constant of radiation with at least equal precision to that obtained by the older method, and the advantages (1) that the new method is independent of the variability of atmospheric transparency, and (2), that it requires only about one-fifth as much time as the old.

Respectfully submitted.

C. G. Abbot,
Director, Astrophysical Observatory.

Dr. C. D. Walcott,
Secretary, Smithsonian Institution.

APPENDIX 6.

REPORT ON THE LIBRARY.

SIR: I have the honor to submit the following report on the activities of the library of the Smithsonian Institution during the fiscal year ended June 30, 1919:

The receipts of publications during the year numbered 24,670 packages. Of these, 23,517 were received by mail and 1,153 through the international exchanges. Five hundred and sixty-one volumes were completed and 11,443 periodicals were entered.

SMITHSONIAN LIBRARY.

Main library.—Publications for the Smithsonian Main Library, after entry on the records, are forwarded to the Library of Congress for the Smithsonian deposit. The accession numbers for the year extended from 529,925 to 532,002. The accessions included 1,883 volumes, 242 parts of volumes, 348 pamphlets, and 87 charts.

The cataloguing covered 2,490 volumes and 85 charts; 1,621 volumes were recatalogued; 4,909 cards were typewritten, and 895 printed cards from the Library of Congress for publications deposited by the institution were filed in the catalogue; 5,721 public documents were presented to the Library of Congress in accordance with the established practice.

The securing of publications in exchange for Smithsonian publications was carried on under war conditions with results that fully warranted the effort, and the completion of sets in the Smithsonian deposit of the Library of Congress has been continued, with the following results:

Number of want cards received from Library of Congress:

From Smithsonian Division	86
From Periodical Division	129
From Order Division	14
	229

Number of publications secured for Library of Congress:

	Volume.	Parts.
For Smithsonian Division	94	381
For Periodical Division	6	145
For Order Division	32	1
	132	527

Number of sets completed, 61.

Office reference library.—The accessions for the office library, which includes the Astrophysical Observatory and the National Zoological

Park, amounted to 639 publications, distributed as follows: Office library, 358 volumes and 20 pamphlets; Astrophysical Observatory, 89 volumes, 11 parts, 18 pamphlets; National Zoological Park, 140 volumes and 3 pamphlets. There was a circulation of 146 volumes.

Aeronautical collection.—Continued interest has been manifested in the institution's collection of aeronautical publications, which has been of special value to aeronautical-research workers in the Army, the Navy, and scientific institutions. Seventy-eight titles have been added during the year. The Bibliography of Aeronautics, completed last year, is being printed by the National Advisory Committee for Aeronautics, and will be ready for distribution shortly.

Reading room.—No new titles of particular interest have been added to the reading room during the year. In the interest of war-time economy on the part of the publishers, several popular magazines were not received in exchange. The number of magazines loaned during the year was 3,140.

Employees' library.—The number of loans in the employees' library was 332. The collection has been recatalogued, classified, and rearranged on the shelves. The volumes in the stacks are being rearranged, so that the magazines in greatest demand will be rendered more accessible.

Art room.—The collection in the art room, including the pieces of statuary as well as the books, have been carefully gone over during the year, and those that could not be considered as relating to the fine arts were sent elsewhere in order to make room for material which should be placed here. The large cases were remodeled in order to take care of the large portfolios of prints, especially those of the Marsh collection, and other books which should be under cover. The whole contents of this room is rearranged, catalogued, classified, and put in thorough order.

De Peyster collection.—Author cards for 1,722 titles of books in the De Peyster collection have been made, and the volumes on French history, numbering 869 titles, have been arranged on the shelves and rendered accessible.

NATIONAL MUSEUM LIBRARY.

The loans made by the Museum library during the year were 13,913, an increase over last year of 2,676. There were catalogued 1,048 volumes, 3,229 pamphlets; 62 volumes and 115 pamphlets were recatalogued; 1,322 volumes were sent to the Government bindery and 710 returned.

The most important acquisition was a set of catalogues of the J. Pierpont Morgan art collection, presented by J. Pierpont Morgan, jr. The set numbers 29 volumes, many of them privately printed in mbered editions. Acknowledgment is due the University of Michi- n for the gift of the 12 volumes published of the Humanistic Series. The accessions were further increased by transfers from the ygienic Laboratory, and contributions from Mr. B. H. Swales, the ate of Dr. Richard Rathbun, Dr. C. D. Walcott, Mr. William haus, Dr. O. P. Hay, Dr. C. W. Richmond, Dr. W. H. Dall, Dr. ary J. Rathbun, Mr. A. H. Clark, Mr. W. R. Maxon, and others.

There were accessioned during the year 2,172 volumes, 2,585 pam- lets, 29 parts of volumes. The number of books in the library w is 141,794, consisting of 54,685 volumes and 87,109 pamphlets and bound papers.

Technological series.—Additions to the technological library num- r 346 volumes, 4,096 parts of volumes, and 750 pamphlets. Current riodicals entered and shelved number 56 volumes and 3,091 parts volumes. The back file of periodicals in the stacks have been amined and recorded from earliest issued to date. Entry was made r 4,249 volumes and 6,172 parts of volumes not entered before in periodical record. The record of all periodicals is now complete d will be kept up to date for reference and consultation; 885 cards re added to the catalogue, 362 being for new material and the nainder of class 500.

In the scientific depository catalogue 10,230 cards were received, ranged, and filed. Of these 3,032 were main author cards, subject adings and titles being added for 7,198 additional cards in accord- ce with the plan of a dictionary catalogue.

The books and periodicals loaned during the year number 121 lumes, 21 pamphlets, and 104 periodicals or parts of volumes, king a total circulation of 245.

Sectional library, Division of Plants.—The revision of the books, rials, and periodicals in the Division of Plants has been satisfac- rily completed. A card catalogue has been made of all of the oks in the sectional library, numbering 896 titles, or 1,308 volumes. periodical card record has been made for the recording of all lumes and parts of volumes now in the section, and current num- rs are to be entered as received. The total number of publications us recorded is 781 volumes and 153 parts of volumes. All com- eted volumes of unbound periodicals, numbering 38, have been llated and sent to the bindery.

In the course of revision, 104 volumes were transferred from the ain library to the sectional library, inasmuch as they proved to be special value to the division, and 64 volumes of lesser direct bear- g on the division's work were transferred to the stacks of the main rary; 510 volumes of the recent Biltmore acquisition were re- und or repaired and placed on the shelves either in the sectional rary or in the main library stack rooms.

The entire collections have been gathered together and shelved in alphabetical order in the old regents' room, with the exception of a small number of books kept in adjoining offices, where they are especially needed. A card catalogue case has been ordered and will be placed in the library room, to contain not only the catalogue of the sectional library of the Division of Plants but also a duplicate card catalogue which has been prepared of all books and periodicals of the main Museum library on the subject of botany. By collecting these and shelving them in the first floor stacks in the west end of the Smithsonian Building, next to the John Donnell Smith collection, all the available works on botanical subjects have been brought together and rendered readily accessible.

Sectional libraries.—Following is a complete list of sectional libraries:

Administration.
Administrative assistant's office.
Anthropology
Biology.
Birds.
Botany.
Comparative anatomy.
Editor's office.
Ethnology.
Fishes.
Food
Geology.
Graphic arts.
History.
Insects.
Invertebrate paleontology.
Mammals.
Marine invertebrates.
Materia medica.
Mechanical technology.
Mesozoic fossils.
Mineral technology.
Minerals.
Mollusks.
Oriental archeology.
Paleobotany.
Parasites.
Photography.
Physical anthropology.
Prehistoric archeology.
Property clerk.
Registrar's office.
Reptiles and batrachians.
Superintendent's office.
Taxidermy.
Textiles.
Vertebrate paleontology.
War library.
Wood technology.

BUREAU OF AMERICAN ETHNOLOGY LIBRARY.

A report of the operations of the library of the Bureau of American Ethnology will be found in the report of that bureau. This library is administered under the direct care of the ethnologist in charge.

ASTROPHYSICAL OBSERVATORY LIBRARY.

The collection of reference works relating to astrophysics has been in constant use. Eighty-nine volumes, 11 parts of volumes, and 18 pamphlets were accessioned during the year.

NATIONAL ZOOLOGICAL PARK LIBRARY.

The library of the National Zoological Park made an increase during the year of 140 volumes and 3 pamphlets. This library is not extensive, but is simply a working library.

SUMMARY OF ACCESSIONS.

The accessions during the year, with the exception of the library of the Bureau of American Ethnology, may be summarized as follows:

To the Smithsonian deposit in the Library of Congress, including parts to complete sets	2,077
To the Smithsonian office, Astrophysical Observatory, and National Zoological Park	639
To the United States National Museum	4,786
	7,502

Respectfully submitted.

PAUL BROCKETT,
Assistant Librarian.

Dr. CHARLES D. WALCOTT,
Secretary of the Smithsonian Institution.

APPENDIX 7.

REPORT ON THE INTERNATIONAL CATALOGUE OF SCIENTIFIC LITERATURE.

SIR: I have the honor to submit the following report on the operations of the United States Bureau of the International Catalogue of Scientific Literature for the fiscal year ending June 30, 1919.

Notwithstanding the fact that the war in Europe practically ceased when the armistice of November 11, 1918, was declared, international affairs are still in such a chaotic state that no reorganization of the International Catalogue has yet been possible. All of the regional bureaus are in practically the same condition as they were in 1918, and are having difficulty in obtaining suitable aid to carry on their work. These conditions also greatly hamper the work of the Central Bureau in London, which, in addition, is faced with the pressing need of greater financial assistance.

The receipts of the London Central Bureau, whose sole support is derived from sales of the catalogue to the various subscribers throughout the world, have been greatly curtailed and unless subscriptions increase or the bureaus of Germany, Austria, Hungary, Poland, Belgium, and Russia, who are in arrears to the extent of almost $9,000 per annum, again contribute their support it will be necessary to obtain assistance from some other source to finance the enterprise after the publication of the fourteenth annual issue.

Since the publication of the last annual report of this bureau eight volumes of the catalogue have been published, which completes the work through the thirteenth annual issue, with the exception of one volume, that of physiology. Twelve of the 17 volumes of the fourteenth annual issue have been published.

This bureau has continued to collect and classify the publications of the United States, and has now on hand a great quantity of material for the future volumes of the catalogue; indeed, in spite of war conditions, some of the sciences, notably zoology, have been indexed far in advance of the published volumes.

It has been evident ever since the beginning of the war that there would have to be a general reorganization of the catalogue when international affairs become sufficiently settled to enable the various countries taking part in the enterprise to decide how much aid they can individually render in order that the ever-increasing literature of science may be made available for general reference, and then through their representatives and delegates agree with the other nations on a plan to continue this great international index to science. Methods and means were very thoroughly considered before beginning the publication of the catalogue in 1901, and the methods then decided on and the classification schedules then published were probably at that time the best means of attaining the end sought: but the condition of the world and the methods and aims of scientific workers have now so changed that it is apparent that the organization and methods of the International Catalogue need revision. The Royal Society of London, which has been the principal sponsor of the catalogue since the beginning, has recently announced that after the completion of the fourteenth annual issue it will be necessary for some new financial agreement to be made in order to continue the work, and has requested the scientific academies throughout the world to offer suggestions as how best to accomplish the end in view.

It may be well to here consider the need and aim of an international organization to catalogue scientific literature.

Many of the greatest minds of the day are engaged in researches and investigations the results of which are finally published in some form. It is obvious that means should exist to enable other workers in the same or similar fields as well as the general reader to refer to these publications.

Revolutionizing advances in many of the arts, industries, and trades are often made by means of scientific research, and what to-day appears to be an abstract investigation in pure science to-morrow becomes a stepping-stone to some epoch-making invention which either entirely changes an old or establishes a new trade or industry. This was true even before the present war, but since then cases of such revolutionary discoveries have multiplied to such an extent that it is hardly necessary to cite examples. All of the sciences have their special journals, many of which publish very complete indexes and even abstracts likely to be of interest to the specialists in various sciences, but there is no publication similar to the International Catalogue of Scientific Literature, whose aim is to index and classify all of the literature of the pure sciences of the world. It has been one of the aims of the catalogue since the beginning to cooperate with the editors and publishers of other similar indexes in order to obviate duplication of labor. Cooperation of this kind has been accomplished in several cases, notably that of the Zoological Record, which from 1906 to 1914 was published through the cooperation of the International Catalogue and the Zoological Society of London, with the result that the combined volume was universally acknowledged to be far superior to any index of the kind ever published or, indeed, attempted. At the convention held in London in 1910 a committee was appointed and authorized to form similar combinations with the publishers of other indexes and yearbooks, but, unfortunately, for various reasons it has not yet been possible to form such combinations to the extent authorized by the convention.

Very respectfully, yours,

LEONARD C. GUNNELL,
Assistant in Charge.

Dr. CHARLES D. WALCOTT,
Secretary Smithsonian Institution.

APPENDIX 8.

REPORT ON THE PUBLICATIONS.

t: I have the honor to submit the following report on the pub-
ons of the Smithsonian Institution and its branches during the
ending June 30, 1919:

e Institution proper published during the year 10 papers in
eries of Miscellaneous Collections, pamphlet copies of 2 Annual
rt separates, and 1 special publication. The Bureau of Ameri-
Ethnology published 5 bulletins, 1 Annual Report, and 1 ad-
e extract from the volume. The United States National Mu-
issued 2 annual reports, 2 volumes of the proceedings, 48
ate papers forming parts of these and other volumes, 6 bulle-
and 20 separate parts of other bulletins.

e total number of copies of publications distributed by the
tution and its branches was 161,288, which includes 404 volumes
separate memoirs of Smithsonian Contributions to Knowledge,
3 volumes and separate pamphlets of Smithsonian Miscel-
us Collections, 13,885 volumes and separate pamphlets of
hsonian Annual Reports, 118,332 volumes and separates of Na-
l Museum publications, 11,483 publications of the Bureau of
rican Ethnology, 1,444 special publications, 10 volumes of the
ls of the Astrophysical Observatory, 69 reports of the Harri-
Alaska Expedition, and 58 reports of the American Historical
ciation.

SMITHSONIAN MISCELLANEOUS COLLECTIONS.

the Miscellaneous Collections, volume 67, 1 paper was pub-
l; volume 68, 1 paper, title page, and table of contents; volume
papers; volume 70, 1 paper; in all, 11 issues, as follows:

VOLUME 67.

4. Cambrian Geology and Paleontology. IV, No. 4. Appendages of
ites. By Charles D. Walcott. December, 1918. 216 pp. (Publ. 2523.)

VOLUME 68.

e page and table of contents. (Publ. 2526.) December 20, 1918.
12. Explorations and Field-Work of the Smithsonian Institution in 1917.
p. (Publ. 2492.) July 24, 1918.

VOLUME 69.

2. The Mosses Collected by the Smithsonian African Expedition, 1909–10.
. N. Dixon. October 8, 1918. 30 pp. (Publ. 2494.)

No. 4. Early Mesozoic Physiography of the Southern Rocky Mountains. By Willis T. Lee. July, 1918. 50 pp. (Publ. 2497.)

No. 8. Uganda Mosses Collected by R. Dümmer and others. By H. N. Dixon. Oct. 21, 1918. 11 pp. (Publ. 2522.)

No. 9. The Smithsonian Eclipse Expedition of June 8, 1918. By L. B. Aldrich. March 5, 1919. 22 pp. (Publ. 2527.)

No. 10. The Reflecting Power of Clouds. By L. B. Aldrich. February 10, 1919. 9 pp. (Publ. 2530.)

No. 11. The Races of Russia. By Aleš Hrdlička. March, 1919. 21 pp. (Publ. 2532.)

No. 12. Begoniaceae Centrali-Americanae et Ecuadorenses. By Casimir de Candolle. April 9, 1919. 10 pp. (Pub. 2533.)

VOLUME 70.

No. 1. A Lower Cambrian Edrioasterid (Stromatocystites walcotti). By Charles Schuchert. May 8, 1919. 9 pp. (Publ. 2534.)

SMITHSONIAN ANNUAL REPORTS.

Report for 1917.

The general appendix of the report for 1917, which was still in press at the end of the year, contains the following papers:

Projectiles Containing Explosives, by Commandant A. R.

Gold and Silver Deposits in North and South America, by Waldemar Lindgren.

The Composition and Structure of Meteorites Compared with that of Terrestrial Rocks, by George P. Merrill.

Corals and the Formation of Coral Reefs, by Thomas Wayland Vaughan.

The Correlation of the Quaternary Deposits of the British Isles with those of the Continent of Europe, by Charles E. P. Brooks.

Floral Aspects of the Hawaiian Islands, by A. S. Hitchcock.

Natural History of Paradise Key and the near-by Everglades of Florida, by W. E. Safford.

Notes on the Early History of the Pecan in America, by Rodney H. True.

The Social, Educational, and Scientific Value of Botanic Gardens, by John Merle Coulter.

Bird Rookeries of the Tortugas, by Paul Bartsch.

An Economic Consideration of Orthoptera directly Affecting Man, by A. N. Caudell.

An Outline of the Relations of Animals to their Inland Environments, by Charles C. Adams.

The National Zoological Park: A Popular Account of its Collections, by N. Hollister.

Ojibway Habitations and other Structures, by David I. Bushnell, jr.

The Sea as a Conservator of Wastes and a Reservoir of Food, by H. F. Moore.

National Work at the British Museum—Museums and Advancement of Learning, by F. A. Bather.

Leonhard Fuchs, physician and botanist, by Felix Neumann.

In memoriam: Edgar Alexander Mearns, by Charles W. Richmond.

William Bullock Clark.

REPORT FOR 1918.

The report of the executive committee and proceedings of the *Board* of Regents of the Institution and report of the secretary, both forming part of the annual report of the Board of Regents to Congress, were issued in pamphlet form in December, 1918.

Report of the executive committee and proceedings of the Board of Regents of the Smithsonian Institution for the year ending June 30, 1918. 13 pp. (Publ. 2529.)

Report of the Secretary of the Smithsonian Institution for the year ending June 30, 1918. 101 pp. (Publ. 2487.)

The general appendix of the report for 1918, which was in press at the close of the year, contains the following papers:

1. The Discovery of Helium, and what came of it, by C. G. Abbot.
2. An Account of the Rise of Navigation, by R. H. Curtiss.
3. The Tornadoes of the United States, by Prof. Robert DeC. Ward.
4. Wind Power, by Janes Carlill.
5. A Tribute. Samuel Pierpont Langley: Pioneer in Practical Aviation, by Henry Leffmann.
6. Modern Physics, by R. A. Millikan.
7. The Experiments of Dr. P. W. Bridgman on the Properties of Matter When Under High Pressure. Introductory note, by C. G. Abbot.
8. The problem of Radioactive Lead, by Theodore W. Richards.
9. Sphagnum Moss; war substitute for cotton in absorbent surgical dressings, by Prof. George E. Nichols.
10. History of Military Medicine and its Contributions to Science, by Col. W. P. Chamberlain.
11. Some Problems of International Readjustment of Mineral Supplies as Indicated in Recent Foreign Literature, by Eleanora F. Bliss.
12. Reptile Reconstructions in the United States National Museum, by Charles W. Gilmore.
13. A Pleistocene Cave Deposit of Western Maryland, by J. W. Gidley.
14. Paleobotany: A Sketch of the Origin and Evolution of Floras, by Edward W. Berry.
15. The Direct Action of Environment and Evolution, by Prince Kropotkin.
16. The Law of Irreversible Evolution, by Branislav Petronievics.
17. The Fundamental Factor of Insect Evolution, by S. S. Chetverikov.
18. The Psychic Life of Insects, by E. L. Bouvier.
19. Sexual Selection and Bird Song, by Chauncey J. Hawkins.
20. Marine Camoufleurs and their Camouflage: The present and prospective significance of facts regarding coloration of tropical fishes, by W. H. Longley.
21. Foot-Plow Agriculture in Peru, by O. F. Cook.
22. Sun Worship of the Hopi Indians, by J. Walter Fewkes.
23. The League of the Iroquois and its Constitution: A constitutional league of peace in the Stone Age of America, by J. N. B. Hewitt.
24. The Problem of Degeneracy, by H. F. Tredgold.
25. History in Tools, by W. M. Flinders Petrie.
26. The Background of Totemism, by E. Washburn Hopkins.
27. A Great Naturalist: Sir Joseph Hooker, by Sir E. Ray Lankester.

SPECIAL PUBLICATIONS.

The following publication was issued in octavo form:

Classified list of Smithsonian publications available for distribution October 15, 1918. 1918. 31 pp. (Publ. 2524.)

PUBLICATIONS OF THE UNITED STATES NATIONAL MUSEUM.

The publications of the National Museum are: (*a*) The annual report to Congress; (*b*) The Proceedings of the United States National Museum; and (*c*) The Bulletin of the United States National Museum, which includes the Contributions from the United States National Herbarium. The editorship of these publications is vested in Dr. Marcus Benjamin.

During the year the museum published 2 annual reports, 2 volumes of the proceedings, 48 separate papers forming parts of these and other volumes, 6 bulletins, and 20 separate parts of other bulletins.

The issues of the proceedings were as follows: Volumes 52 and 53 complete.

The issues of the bulletins were as follows:

Bulletin 50, Part VIII. The Birds of North and Middle America, by Robert Ridgway.

Bulletin 99. East African Mammals in the United States National Museum; Part I, Insectivora, Chiroptera, and Carnivora; and Part II, Rodentia, Lagomorpha, and Tubutidentata, by N. Hollister.

Bulletin 100. Contributions to the Biology of the Philippine Archipelago and Adjacent Regions. Volume 1, part 4: Report on the Chaetognatha collected by the United States Fisheries Steamer *Albatross* during the Philippine Expedition, 1907–1910, by Ellis L. Michael; part 5, Hydromedusae, Siphonophores, and Ctenophores of the *Albatross* Philippine Expedition, by Henry B. Bigelow. Volume 2, part 1: The Salpidae collected by the United States Fisheries Steamer *Albatross* in Philippine waters during the years 1908 and 1909, by Maynard M. Metcalf; part 2: The Salpidae—a taxonomic study, by Maynard M. Metcalf and Mary M. Bell. Volume 3: Contributions to the Biology of the Philippine Archipelago and Adjacent Regions. Starfishes of the Philippine Seas and Adjacent Waters, by Walter K. Fisher.

Bulletin 102, volume 1. The Energy Resources of the United States—a field for reconstruction, by Chester G. Gilbert and Joseph E. Pogue. Also, The Mineral Industries of the United States. Part 5: Power—its significance and needs, by Chester G. Gilbert and Joseph E. Pogue. Part 6: Petroleum—a Resource Interpretation, by Chester G. Gilbert and Joseph E. Pogue. Part 7: Natural Gas—its production, service, and conservation, by Samuel S. Wyer.

Bulletin 103. Contributions to the Geology and Paleontology of the Canal Zone, Panama, and geographically related areas in Central America and the West Indies, represents the work of a number of specialists, whose papers were issued, in separate form, as follows:

Pages 1–13: On some fossil and recent Lithothamnieae of the Panama Canal Zone, by Marshall A. Howe.

Pages 15–44: The Fossil Higher Plants from the Canal Zone, by Edward W. Berry.

Pages 45–87: The Smaller Fossil Foraminifera of the Panama Canal Zone, by Joseph Augustine Cushman.

Pages 89–102: The Larger Fossil Foraminifera of the Panama Canal Zone, by Joseph Augustine Cushman.

Pages 103–116: Fossil Echini of the Panama Canal Zone and Costa Rica, by Robert Tracy Jackson.

Pages 117–122: Bryozoa of the Canal Zone and related areas, by Ferdinand nu and Ray S. Bassler.

Pages 123–184: Decapod Crustaceans from the Panama Region, by Mary J. athbun.

Pages 185–188: Cirripedia from the Panama Canal Zone, by H. A. Pilsbry.

Pages 525–545: The Sedimentary Formations of the Panama Canal Zone, ith special reference to the Stratigraphic relations of the fossiliferous beds, Donald Francis MacDonald.

Pages 547–612: The Biologic Character and Geologic Correlation of the edimentary Formation of Panama in their relation to the geologic history Central America and the West Indies, by Thomas Wayland Vaughan.

Bulletin 104 (one part). The Foraminifera of the Atlantic Ocean, by Joseph ugustine Cushman, viz: Part 1, "Astrorhizidae," was issued. Of the remain- g separates, two formed parts of volume 20, Contributions from the United tates National Herbarium, while 19 were from volume 54, and 29 from vol- me 55 of the Proceedings.

Bulletin 105. Catalogue of the Postage Stamps and Stamped Envelopes of e United States and Possessions, issued prior to January 1, 1919, by Josiah . Leavy.

PUBLICATIONS OF THE BUREAU OF AMERICAN ETHNOLOGY.

The publications of the bureau are discussed in Appendix 2. The litorial work of the bureau is in charge of Mr. Stanley Searles, litor.

During the year five bulletins, the Thirty-second Annual Report, a advance extract from this report, and a list of publications were sued, as follows:

Bulletin 59. Kutenai Tales. Franz Boas. 1918. 387 pp.

Bulletin 61. Teton Sioux Music. Frances Densmore. 1918. 561 pp., 82 plates.

Bulletin 64. The Maya Indians of Southern Yucatan and Northern British onduras. Thomas W. F. Gann. 1918. 146 pp., 28 plates.

Bulletin 65. Archeological Explorations in Northeastern Arizona. Alfred Vin- ent Kidder and Samuel J. Guernsey. 1918. 228 pp., 97 plates.

Bulletin 66. Recent Discoveries Attributed to Early Man in America. Aleš rdlička. 1918. 67 pp., 14 plates.

Introduction to Seneca Fiction, Legends, and Myths. Collected by Jeremiah urtin and J. N. B. Hewitt. Edited by J. N. B. Hewitt. 1919. An advance eparate from the Thirty-second Annual Report. 71 pp.

Thirty-second Annual Report—Accompanying paper: Seneca Fiction, Leg- nds, and Myths. (Hewitt and Curtin.) 819 pp.

List of publications of the bureau.

There are at present in press five annual reports, and nine bulletins s follows:

Bulletin 60. Handbook of Aboriginal American Antiquities. Part 1 Holmes).

Bulletin 67. Alsea Texts and Myths (Frachtenberg).

Bulletin 68. Structural and Lexical Comparison of the Tunica, Chitimacha, nd Atakapa Languages (Swanton).

Bulletin 69. Native Villages and Village Sites East of the Mississippi (Bushell).

Bulletin 70. Prehistoric Villages, Castles, and Towers (Fewkes).

Bulletin 71. Native Cemeteries and Forms of Burial East of the Mississippi (Bushnell).

Bulletin 72. The Owl Sacred Pack of the Fox Indians (Michelson).

Bulletin —. Handbook of the Indians of California (Kroeber).

Bulletin —. Northern Ute Music (Densmore).

REPORT OF THE AMERICAN HISTORICAL ASSOCIATION.

The annual reports of the American Historical Association are transmitted by the association to the secretary of the Smithsonian Institution and are communicated to Congress under the provisions of the act of incorporation of the association.

Volume 1 of the report for 1916 was published during the year, and volume 2 of the same report was in press on June 30.

REPORT OF THE NATIONAL SOCIETY OF THE DAUGHTERS OF THE AMERICAN REVOLUTION.

The manuscript of the twenty-first annual report of the National Society of the Daughters of the American Revolution was transmitted to Congress according to law shortly after the close of the fiscal year.

THE SMITHSONIAN ADVISORY COMMITTEE ON PRINTING AND PUBLICATION.

The editor has continued to serve as secretary of the Smithsonian advisory committee on printing and publication. This committee passes on all manuscripts offered for publication by the Institution or its branches, and considers forms of routine, blanks, and various other matters pertaining to printing and publication. Thirteen meetings were held during the year and 79 manuscripts were acted upon.

Respectfully submitted.

W. P. TRUE, *Editor.*

To Dr. CHARLES D. WALCOTT,
Secretary of the Smithsonian Institution.

○

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W. P. True, *Editor.*

To Dr. Charles D. Walcott,
Secretary of the Smithsonian Institution.

○

REPORT OF THE SECRETARY OF THE SMITHSONIAN INSTITUTION

FOR THE YEAR ENDING JUNE 30

1920

(Publication 2586)

WASHINGTON
GOVERNMENT PRINTING OFFICE
1920

EPORT OF THE SECRETARY
OF THE SMITHSONIAN
INSTITUTION

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1920

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1920

REPORT

OF THE

ECRETARY OF THE SMITHSONIAN INSTITUTION,

CHARLES D. WALCOTT,

FOR THE YEAR ENDING JUNE 30, 1920.

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the BOARD OF REGENTS OF THE SMITHSONIAN INSTITUTION.

ENTLEMEN: I have the honor to submit herewith the annual re-
t on the activities and condition of the Smithsonian Institution
l its branches during the year ending June 30, 1920. An account
the affairs of the Institution itself, together with a summary of
work of the several branches, are given on the first 26 pages of
s report, while the appendixes are devoted to more detailed ac-
nts of the operations during the year of the National Museum, the
reau of American Ethnology, the International Exchange Service,
National Zoological Park, the Astrophysical Observatory, the
ithsonian Library, the International Catalogue of Scientific Lit-
ture, and an account of the publications of the Institution and its
nches.

THE SMITHSONIAN INSTITUTION.

THE ESTABLISHMENT.

he Smithsonian Institution was created by act of Congress in
6, according to the terms of the will of James Smithson, of Eng-
d, who in 1826 bequeathed his property to the United States of
erica "to found at Washington, under the name of the Smith-
ian Institution, an establishment for the increase and diffusion of
wledge among men." In receiving the property and accepting
trust Congress determined that the Federal Government was
hout authority to administer the trust directly, and therefore con-
uted an "establishment," whose statutory members are "the Presi-
t, the Vice President, the Chief Justice, and the heads of the
cutive departments."

THE BOARD OF REGENTS.

The affairs of the Institution are administered by a Board of Regents whose membership consists of "the Vice President, the Chief Justice, three Members of the Senate, and three Members of the House of Representatives, together with six other persons other than Members of Congress, two of whom shall be resident in the city of Washington and the other four shall be inhabitants of some State, but no two of them of the same State." One of the regents, usually the Chief Justice, is elected chancellor by the board, and a suitable person is chosen by them as secretary of the Institution, who is also secretary of the Board of Regents and the executive officer directly in charge of the Institution's activities.

During the year Senator Medill McCormick was appointed a regent to succeed Senator Hollis, whose term as Senator had expired. Representative John A. Elston was appointed to succeed Representative Scott Ferris. Representatives Padgett and Greene were reappointed as regents, and Charles F. Choate, jr., was reelected a citizen regent by the Congress. The roll of regents at the close of the fiscal year was as follows: Edward D. White, Chief Justice of the United States, chancellor; Thomas R. Marshall, Vice President of the United States; Henry Cabot Lodge, Member of the Senate; Charles S. Thomas, Member of the Senate; Medill McCormick, Member of the Senate; Lemuel P. Padgett, Member of the House of Representatives; Frank L. Greene, Member of the House of Representatives; John A. Elston, Member of the House of Representatives; Alexander Graham Bell, citizen of Washington, D. C.; George Gray, citizen of Delaware; Charles F. Choate, jr., citizen of Massachusetts; John B. Henderson, citizen of Washington, D. C.; Henry White, citizen of Maryland; and Robert S. Brookings, citizen of Missouri.

The board held its annual meeting on December 11, 1919. The proceedings of that meeting, as well as the annual financial report of the executive committee, have been printed as usual for the use of the regents, while such important matters acted upon as are of public interest are reviewed under appropriate heads in the present report of the secretary. A detailed statement of disbursements from the Government appropriations under the direction of the Institution for the maintenance of the National Museum, the National Zoological Park, and other branches will be submitted to Congress by the secretary in the usual manner in accordance with the law.

GENERAL CONSIDERATIONS.

The usual routine operations of the Institution in the "increase and diffusion of knowledge among men" were continued during the [illegible] including a mass of correspondence with individuals and scientific establishments throughout the world. It is becoming increasingly difficult for the Institution with its extremely limited funds, in the face of greatly increased costs in every phase of its activity, to carry on effective work. However, in spite of the fact that the Institution's endowed funds have never been materially increased, it has been possible in some measure to advance knowledge and publish the results of scientific work, as noted in the following report on the year's activities.

It is my sad duty to note here the death during the year of Mr. Charles L. Freer, of Detroit, an irreparable loss to the art interests of the country. As stated in previous reports, Mr. Freer presented his unrivaled collections of American and oriental art to the Smithsonian Institution in 1906, and provided $500,000 (later increased to $1,000,000) for the erection of a suitable building to house the collection. This building is now practically completed and nearly ready for the installation of the collections. That Mr. Freer did not live to see the fulfillment of his splendid art gift to the Nation is greatly to be regretted. An interesting article by Miss Katharine N. Rhoades on the recent additions to the Freer Collections appeared in Art and Archeology, October, 1919.

In addition to allotments for the maintenance of the Smithsonian solar observing station at Calama, Chile, several small grants for original research have been made from the Hodgkins fund of the Institution—one to Dr. L. G. Hoxton, professor of physics at the University of Virginia, for research on the Joule-Thomson effect in various gases; another to Mr. Alexander Wetmore, of the Biological Survey of the United States Department of Agriculture, for carrying on investigations of the body temperatures of birds; and a third to the Austrian Meteorological Association for the purpose of aiding in continuing the publication of the Meteorologische Zeitschrift and for the support of the meteorological observatory on the Sonnblick. Both of these were in danger of being discontinued on account of lack of funds, and their cessation would have been a great loss to meteorology.

Working also under a grant from the Hodgkins fund, Prof. Robert H. Goddard, of Clark College, continued his researches on a multiple-charge rocket for reaching great altitudes mentioned in last year's report. The early results of his experiments were published during the year by the Institution under the title "A Method of Reaching Extreme Altitudes," in which Prof. Goddard showed that it would be perfectly possible by means of his new type of high-efficiency rocket to send recording instruments to the hitherto unknown upper layers of the atmosphere and to provide for their safe return, thus obtaining new data of the greatest interest and scientific value to

The disbursements, which are described in the annual report of the executive committee, amounted to $160,606.79, leaving a balance on deposit with the Treasurer of the United States, in cash and in bank, amounting to $13,304.34.

The Institution was charged by Congress with the disbursement of the following appropriations for the year ending June 30, 1920:

International Exchanges	$45,000
American Ethnology	42,000
International Catalogue of Scientific Literature	7,500
Astrophysical Observatory	13,000
National Museum:	
Furniture and fixtures	20,000
Heating and lighting	69,715
Preservation of collections	300,000
Building repairs	10,000
Books	2,000
Postage	500
Heating equipment, Aircraft Building	14,000
National Zoological Park	115,000
Increase of compensation (indefinite)	-----
Total	638,715

In addition to the above, there was included under the general appropriation for printing and binding an allotment of $76,200 to cover the cost of printing and binding the Smithsonian annual report and reports and miscellaneous printing for the Government branches of the Institution.

RESEARCHES AND EXPLORATIONS.

Every year the Institution sends out or participates in, so far as its limited means will permit, expeditions for the purpose of increasing scientific knowledge in various parts of the world which have been previously but imperfectly known to science. In former years every continent and nearly every country on the globe has been visited by Smithsonian scientific explorers, and the result has been the accumulation of a valuable mass of information on the people, fauna, flora, geology, geography, ethnology, etc., of the various regions visited. Many of the more important results of these expeditions have been published by the Institution, and thereby have the chief objects of the Smithsonian as laid down by its founder, "the increase and diffusion of knowledge among men," been carried out.

While the prevailing universal high costs have considerably reduced the effectiveness of the Institution's funds for research and exploration, nevertheless several expeditions were in the field during the past year, and the activities of some of these are here briefly described.

GEOLOGICAL EXPLORATION IN THE CANADIAN ROCKIES.

Geological field work in the Canadian Rocky Mountains was continued by your secretary during the field season of 1919, with the following objects in view: (1) The discovery of an unmetamorphosed, undisturbed section of the Upper Cambrian formations north of the Canadian Pacific Railway; and (2) the collection of fossils to determine the various formations and to correlate them with the Upper Cambrian formations elsewhere. The region selected for examination was the area about Glacier Lake, which was reached through Bow Pass, down the Mistaya Creek to the Saskatchewan River, and thence up to the headwaters of the Middle Fork.

The geological section measured is of such interest that I will describe it briefly. The rocks exposed in the highest cliffs of Mount Forbes and Mons Peak belong to the great Carboniferous system of rocks of this region. Below this series is a belt 1,000 feet or more in thickness comprising the Devonian rocks, beneath which are the strata of the Sarbach formation of the Ordovician system. Under these again are the five formations of the Upper Cambrian series, and at one place near Mount Murchison is a low ridge formed of strata of Middle Cambrian age.

Special attention was given to the glaciers of which there are many fine examples in the region. Beautiful photographs of some of these were obtained, one showing a complete glacier from its névé to its foot. A preliminary examination of the fossils in the formations studied correlates them with the Upper Cambrian formations of Wisconsin and Minnesota and the Upper Cambrian section in southern Idaho, and to a lesser extent with that of the central belt of Pennsylvania.

PALEONTOLOGICAL FIELD WORK.

Two short field trips were taken during the year by Dr. R. S. Bassler, curator of paleontology, for the purpose of securing certain specimens of fossils and rocks required for the Museum exhibition series. During the previous year some excellent exhibition specimens had been located in southeastern Indiana, but owing to the impossibility of securing help to get them to a freight station, it had been necessary to leave them. This year, conditions being the same, they were carefully wrapped in burlap and padded with a quantity of weeds and laboriously dragged along the rails to the nearest station. The same method was used in transporting to a station the specimens found this year along a creek in the same locality, where heavy spring freshets had uncovered some richly fossiliferous layers of rock. One of these specimens, a slab several feet in length and width, was crowded with impressions of the branching fossil seaweed *Butho-*

trephis, and with excellent examples of the dumb-bell seaweed *Arthraria.* A specimen showing an assemblage of these ancient plant remains had long been needed in the fossil-plant exhibition series in the Museum.

Later in the year, Dr. Bassler proceeded to Dayton, Ohio, to prepare for shipment to Washington the largest entire American trilobite so far discovered. The trilobite was uncovered by the pick of a workman in the excavations for the Huffman conservancy dam, 6 miles east of Dayton. Mr. Arthur E. Morgan, chief engineer of the Miami conservancy district, recognized the scientific value of the fossil animal and presented it to the Institution, where it now forms a most unique and instructive exhibit in the hall of invertebrate paleontology of the National Museum. The specimen is of special value since it has become the type of a new species, *Isotelus brachycephalus*, described by Dr. August F. Foerste, of Dayton, Ohio.

THE COLLINS-GARNER FRENCH CONGO EXPEDITION.

The " Collins-Garner expedition in the interests of the Smithsonian Institution," which had been collecting biological material in the French Congo since the summer of 1918, returned to this country early in 1919, but the collections resulting from the expedition were incorporated into the Museum series of African material during the past fiscal year. Mr. C. R. W. Aschemeier, who represented the Institution, collected and turned over to the Museum some 2,500 mammals, birds, reptiles, fishes, and invertebrates, an invaluable addition to the Museum collections.

THE SMITHSONIAN AFRICAN EXPEDITION.

Last year it was announced that an expedition to Africa had been organized to collect plants and animals needed by the Museum to supplement the magnificent collections made on that continent by Col. Theodore Roosevelt and other explorers. This expedition, under the title of the " Smithsonian African expedition, under the direction of Edmund Heller in conjunction with the Universal Film Manufacturing Co.," sailed on July 16 on the steamship *City of Benares*, arriving in Cape Town August 13. Besides Mr. Heller, the Institution was represented by Mr. H. C. Raven, who has in former years made collections for the Smithsonian in Borneo, Celebes, and other regions.

In the vicinity of Cape Town, Mr. Raven was able to collect only insects and invertebrates, and from there he went to the Addo Bush, where 19 days were spent in collecting small mammals and birds. Going through Durban and Johannesburg, Mr. Raven spent two weeks collecting at Ottoshoop in the Transvaal, after which he proceeded to Victoria Falls, and from there he and Dr. Shantz, who was representing the United States Department of Agriculture, left for the Kafue River region, where they camped for several weeks.

After spending some weeks along the Congo, they reached Lake Tanganyika, where camp was made for about a month. The next stop of any length was in Uganda, where a few days over a month was spent in collecting in the Bundogo Forest. As the whole forest was in the sleeping-sickness area, it was necessary to get a special permit from the district commissioner to enter it, and the native boys engaged by Mr. Raven had to be examined by a doctor before entering the area and again on leaving it. At the close of the year, Mr. Raven was at Masindi, in Uganda, preparing to return to the United States.

Only one shipment of material had been received by the end of the year, consisting of 239 mammals and birds from southern Africa, which with the remainder of the specimens still to be received from Mr. Raven, will be of great value in working up the African material already in the Museum collections.

AUSTRALIAN EXPEDITION.

Through the continued generosity of Dr. W. L. Abbott, the Institution sent Mr. Charles M. Hoy to Australia for the purpose of collecting vertebrates, especially those which are in danger of extermination. As the Museum at present contains only about 200 specimens of the remarkable Australian mammal fauna, this expedition is of the utmost scientific importance, especially since in the future it will be impossible to secure an adequate representation of the fauna owing to their rapid extermination.

Mr. Hoy began work in Australia about the 1st of June, 1919, and by the close of the past fiscal year one shipment had been received at the Museum, consisting of 240 mammals and 228 birds. The following passages from reports and letters received from Mr. Hoy give an idea of the conditions under which the collecting was carried on:

> Nine weeks were spent in the Wandandian region (19 miles southwest of Norwra, New South Wales), with the result of but 131 mammals and 124 birds collected. Among the mammals 10 genera and 12 species are represented in my collection.
>
> The greatest agent working toward the extermination of the native animals is the fox; next comes the cattle and sheep men who distribute poison by the cartload in the effort to reduce the rabbits. This has also caused or helped to cause the extermination of some of the ground-inhabiting birds. Another great agent is the bush fires which sweep over the country. These are often lit intentionally in order to clear out the undergrowth and thus increase the grass.
>
> The extermination of the native mammals has apparently gone much further than is generally thought. Many species that were plentiful only a few years ago are now almost, if not altogether, extinct. Diseases have also played a

great part in the extermination. The native bear died in thousands from a disease which produced a great bony growth on their heads. A mysterious disease also spread through the ranks of the native cat, *Dasyurus viverrinus*; the domestic cat also played a great part in their extermination. Even adult specimens of *Dasyurus* were often dragged in by the family cat.

It is the killing and burning of the brush by the cattlemen that does the most to kill off the animals, and they are yearly reaching farther and farther away from the railroads. One thing that was very noticeable was the great abundance of the introduced rats. They seem to have driven out or killed off practically all the native rats, and I found them everywhere.

ANTHROPOLOGICAL RESEARCHES IN THE FAR EAST.

Dr. Aleš Hrdlička, curator of physical anthropology, National Museum, made an extended trip to the Far East in the interest of his researches on the origin of the American Indian and the peopling of eastern Asia. While in China he assisted with the organization of anthropological research in connection with the Peking Union Medical College in China.

During this trip, which occupied over five months, Dr. Hrdlička visited Japan, Korea, Manchuria, northern China, and the border of southern Mongolia, examining the local collections as well as the actual populations. The results of the journey have contributed very materially to the solution of the problems for which the trip was made, in addition to which it was possible to arrange for exchanges of material, and especially to organize a nucleus for anthropological investigation in China.

Dr. Hrdlička returned by way of Hawaii, where a two weeks' stop was made for the study of the natives and of Hawaiian problems in general.

While at Peking Dr. Hrdlička consulted prominent foreigners, as well as Chinese scholars, on the advisability of establishing in Peking, or of taking steps toward the establishment there of a "China Museum of Natural History," which, like the United States National Museum, would include the departments of geology, biology, and anthropology, and which would serve as a center for investigators in these lines in China and the Far East. Before his departure the opportunity was given him by representatives of several of the ministries and other officials to make the proposal more formally, with the result that a committee was to be organized for consideration of the project.

BOTANICAL EXPLORATION IN HAITI.

Through the generosity of Dr. W. L. Abbott, for many years a benefactor of the Institution, it was possible to detail Mr. Emery C. Leonard, aid in the Division of Plants, United States National Museum, as botanical collector to accompany Dr. Abbott to Haiti upon his last visit of exploration in that country, from February to July, 1920. A collection aggregating 10,000 specimens, representing about 2,700 collection numbers, was secured by Mr. Leonard in several characteristic regions. This material will prove of exceptional value and interest from the fact that, little botanical collecting having been done in Haiti, the flora is in consequence very imperfectly known. The field work may be summarized as follows:

After completing their outfit at Port au Prince, the point of arrival, Dr. Abbott and Mr. Leonard proceeded by railroad to St. Marc, thence by native fishing schooner to Gonave Island, lying a short distance off the coast. This island, which is about 30 miles long from east to west and 10 miles broad, is entirely of coral formation, which decomposes to form a very rich reddish soil. Work was carried on principally upon the northern side. A low mountain range forms the backbone of the island, intersected by occasional sharp ravines, in which are found a very few springs. The coast is bordered by an almost unbroken fringe of mangroves, back of which is a belt of bare saline flats. Next in succession is a region of low arid foothills, from which the mountains rise rather abruptly. The hills and slopes are covered with thorny thickets, chiefly of leguminous shrubs and low trees, with cacti interspersed, but the uplands (called La Table) open in large grassy areas, with only scattered trees and shrubs, which afford rich pasture. About three weeks were spent on the north side of the island, working from Anse Galette and Etroite, and somewhat later a week on the south shore, with the small village Pickney as base.

The second part of the exploration covered the region west and south of Lake Saumatre. Access was easily gained by railroad from Port au Prince to Etang, on the west shore of the lake. After a week's collecting in the vicinity of Etang the party traveled by boat to Fond Parisien, on the southeast shore, and, procuring donkeys, proceeded overland to Mission, in the midst of the La Salle Mountains, where an altitude of 2,000 meters was reached. From this elevation down to 900 meters the slopes were sparsely covered with pines, and, where protected from fire, with dense thickets that sheltered a luxuriant growth of ferns. About two weeks were spent in collecting in this region.

The final portion of the field work was carried on in the region of Furcy, which lies a short distance south of Port au Prince. The collections here were made mostly on the wooded ridge east of Furcy on the trail to Grande Touraine. The region is well watered and has a delightful climate, but the country about Furcy itself has been almost entirely cleared of forests.

Of the plants collected perhaps one-third are ferns, the remaining portion consisting of shrubs and herbaceous plants, among which are a considerable number of grasses and cacti. The cacti appear to be of special interest.

BOTANICAL EXPEDITION TO BRITISH GUIANA.

Through the cooperation of the United States Department of Agriculture, the Gray Herbarium of Harvard University, and the New York Botanical Garden, a trip to British Guiana was made by Dr. A. S. Hitchcock, custodian of the section of grasses, National Museum. Dr. Hitchcock reports:

I left New York October 4 and arrived at Georgetown, British Guiana, October 22, visiting on the way down the islands of St. Thomas, St. Croix, St. Kitts, Antigua, Guadeloupe, Dominica, Martinique, St. Lucia, and Barbados. On the return trip in February the islands of Trinidad and Grenada were visited. Collections of grasses were made on all the islands. In British Guiana a general collection of flowering plants was made, a set going to each of the contributing institutions.

My headquarters were at Georgetown, the capital and only large city of the colony. Here there is a good botanical garden and a herbarium of British Guiana plants, known as the Jenman Herbarium. Prof. J. B. Harrison, the director of science and agriculture, is in charge of the scientific activities of the colony and rendered me very efficient aid.

The greater part of British Guiana is covered with virgin forest. The vast savannas of Venezuela extend into the southern part of the colony. The temperature is high, 75° to 85°, according to the season, and the rainfall at Georgetown is about 90 inches. The settlements are mainly along the coast, and travel in the interior is by boat along the numerous rivers. The country for some distance back of the coast is low and wet. The chief industry is the raising of sugar cane. The health of the colony is fairly good, though there is much malaria.

The botanical results were very satisfactory. About 1,200 numbers of plants were collected. Especial attention was given to the grasses, of which 171 species are now known to grow in the colony.

BOTANICAL EXPLORATION IN GLACIER NATIONAL PARK, MONT.

Mr. Paul C. Standley, assistant curator in the Division of Plants, United States National Museum, spent about 10 weeks, from July to September, 1919, in Glacier National Park, Mont., under the authority of the National Park Service, for the purpose of studying the vegetation of the region. A large series of photographs and about 4,000 specimens, representing over 900 species of plants, were obtained, which will serve as the basis of a popular illustrated account of the plants to be published by the Park Service, and a more complete technical paper on the flora, in process of publication by the National Museum. The zonal distribution of the plants, which is of extreme interest, is discussed briefly by Mr. Standley, as follows:

The Continental Divide, which traverses the park, has a marked influence upon plant distribution. On the east slope, whose drainage is partly into the Missouri River and partly into Hudson Bay, the flora is of the Rocky Mountain type, like that of Wyoming and Colorado; while on the west slope, whose streams drain into the Columbia River, the flora is more obviously related to that of the Pacific coast. The forests about Lake McDonald are very dense and are composed of unusually large trees. Although not nearly so extensive, they are much like those of the humid regions of Oregon and Washington.

In the vegetation there are represented four of the life zones recognized by biologists. The transition zone is indicated on the west slope by small areas of yellow-pine timber, and east of the park are the prairies of the Blackfoot Indian Reservation, which extend also within the park boundaries along the stream valleys. The plants here are chiefly herbs, with a few shrubs, and they belong mostly to species which have a wide distribution over the Great Plains. By far the largest portion of the park is covered with the characteristic vegetation of the Canadian zone, which is the heavily forested area. Above the Canadian zone, around timber line (6,000 to 7,500 feet), lies a narrow belt belonging to the Hudsonian zone. The trees here are mostly low and stunted, and their branches frequently lie prostrate upon the ground. Above this belt, and occupying the highest exposed slopes, lies the Arctic-Alpine zone, whose vegetation is composed chiefly of small herbaceous plants, with a few dwarfed shrubs, mostly willows. Many of the species of this zone are widely distributed n alpine or arctic regions of North America, and some of them occur also in similar situations in Europe and Asia.

BOTANICAL EXPLORATION IN JAMAICA.

Mr. William R. Maxon, associate curator in the Division of Plants, United States National Museum, accompanied by Mr. E. P. Killip, id, was detailed to field work in Jamaica in February last for the purpose of making botanical collections in general and of securing ern material for use in connection with a projected volume upon he ferns of Jamaica. Over two months were spent in the island, inluding a period of three weeks in the Blue Mountain region, with he Cinchona botanical station as base. Other regions covered inlude Mount Diablo, Montego Bay, Mill Bank, and Seamens Valley, nd the southern border of the peculiar "cockpit country" above pswich, a wooded area of limestone "sinks." Upward of 10,000 pecimens were collected, representing about 1,700 collection numbers. n addition to the series to be retained by the National Museum, nearly uniform sets of the ferns and flowering plants have been distributed to the Gray Herbarium of Harvard University, the New York Botanical Garden, the Field Museum of Natural History, and he University of Illinois, all of which contributed equally to the field expenses of the work. Sets of the woody plants and orchids have been sent also to the Arnold Arboretum of Harvard University, and o Mr. Oakes Ames, respectively, in return for similar assistance. The lower cryptogams of the collection are in process of identification and will be distributed shortly.

EXPLORATIONS IN SANTO DOMINGO.

During the first three months of the fiscal year Dr. W. L. Abbot continued his scientific investigations in Santo Domingo, stopping at Sosua, on the north side of the island, where a search was made for certain birds needed to fill gaps in the series already collected. The Samaná Peninsula was then explored, after which Dr. Abbot visited the islets of Saona and Catalina, off the southeastern corner of Santo Domingo, and concluded his investigations with a few days' work at Lake Enriquillo.

The material collected on this trip and the previous trip ending ust before the beginning of the fiscal year was varied in character, embracing the several groups of vertebrates as well as mollusks, insects, and plants, with a plentiful series of archeological objects from caves in the Samaná district. Of birds alone, 278 study skins, 87 alcoholics and skeletons, and 56 eggs were collected, including birds representing four species not hitherto possessed by the Museum and three or four other species not previously known to occur on the island.

LECTURES.

Hamilton fund lecture.—The Hamilton fund was placed under the administration of the Institution by the Rev. James Hamilton in 1875, the interest to be used for "lectures on scientific or useful subjects." Under the auspices of this fund an interesting lecture was delivered on April 13 in the auditorium of the National Museum by the Rev. Charles E. Jefferson, D. D., on "The old order and the new," in which Dr. Jefferson gave his views as to the causes which led the world into its present unsettled condition and of the solution of the problems presented.

Lectures for the Y. M. C. A.—At the request of Dr. W. C. Little, field secretary of the Young Men's Christian Association, a series of lectures on scientific subjects written in a style to be instructive and entertaining to a general audience was prepared by members of the staffs of the Institution and its branches, for use in the educational extension work of the association. The scheme was to have these lectures delivered in rotation by volunteer lecturers in many different localities in the United States, thereby reaching a large number of people interested in keeping in touch with the advance of science and progress in general. The lectures prepared by members of the Smithsonian staff were as follows:

The Sun, by C. G. Abbot.
Cave Dwellings of the New and Old Worlds, by J. W. Fewkes.
The Primeval Life of North America, by R. S. Bassler.
A Visit to the Races of Man, by Walter Hough.
In the Land of the Great Natural Bridges, by Neil M. Judd.
The Progress in Land-Transportation, by Carl W. Mitman.
Antiquities of the Bible, by I. M. Casanowicz.
Strange Facts in Nature, by Austin H. Clark.
Flying Animals, by Austin H. Clark.
Interesting Animals and Birds from East Africa, by Austin H. Clark.
Extinct Monsters of North America, by Charles W. Gilmore.
Mammals of Ancient North America, by James W. Gidley.

CINCHONA BOTANICAL STATION.

In my report last year it was stated that negotiations had been begun with the Government of Jamaica to renew the Smithsonian's three-year lease on the Cinchona botanical station which was canceled during the period of the war. This was successfully arranged in January, 1920, and the renewed lease dated from January 1,

he station is maintained by the subscription of a number of insti-
ons in this country for the purpose of enabling accredited inves-
tors to study the rich and interesting flora of the region. From
uary 1 to the close of the year the following botanists planned
vail themselves of the privileges of the station: Messrs. W. R.
on and E. P. Killip, of the United States National Herbarium,
work on the taxonomy of ferns and flowering plants; Mr. Fred-
k Boughton, of Pittsford, N. Y., for collecting fungi; Dr. J. M.
mpson, of Glasgow, for work on the ferns; and Prof. R. E.
forth, of Rutgers College, also for work on the ferns.

EXHIBITION OF SOUTH AMERICAN HISTORICAL DOCUMENTS.

rom July 28 to August 9, 1919, there was held in the Smithsonian
lding an exhibition of South American historical documents
ght together by Señor Don Jorge M. Corbacho, a member of the
uvian Parliament and delegate to the Pan American Congress.
collection containing official documents signed by the Spanish
quistadores, the viceroys at Lima and the revolutionary leaders
ing the wars for independence, was one of inestimable value and
shown at the Smithsonian for the first time in North America.

RESEARCH IN TROPICAL AMERICA.

n June, 1920, the National Research Council, of which your
etary is a vice chairman, held a conference on the project of incor-
ating an institute for promoting research in tropical America,
uding exploration and the establishing of laboratories and re-
ch stations, and of effecting cooperation between the institutions
rested in tropical research and exploration. The membership of
proposed institute was to consist of representatives (one each)
n institutions interested in such research, and these institutions
e invited by the Research Council to appoint representatives, but
he close of the year replies had not been received.

PUBLICATIONS.

he Institution and its branches issued during the year 95 volumes
separate pamphlets. Of these various publications there were
ributed a total of 143,290 copies, which includes 157 volumes and
rates of Smithsonian Contributions to Knowledge, 24,949 vol-
s and separates of Smithsonian Miscellaneous Collections, 16,720
mes and separates of Smithsonian Annual Reports, 81,936 vol-
s and separates of the various series of the National Museum,
61 publications of the Bureau of American Ethnology, 1,958
ial publications, 19 volumes of the Annals of the Astrophysical

Observatory, 23 reports on the Harriman Alaska expedition, and 564 reports of the American Historical Association.

Through its publications the Institution carries out one of its principal objects, the "diffusion of knowledge." The Smithsonian series, except the annual report, are printed from Smithsonian funds in small editions for distribution principally to libraries and scientific and educational establishments throughout the world. The annual report, containing a general appendix consisting of a number of articles illustrating recent advances in nearly every branch of science, is printed by congressional appropriation in editions of 10,000 copies and is in great demand throughout the country. The Museum and Bureau of Ethnology publications are discussed in detail in the reports of those branches appended to this report.

Of the Smithsonian Miscellaneous Collections, 14 numbers were issued, among which may be mentioned 2 papers by your secretary on his researches in Cambrian geology and paleontology, a paper showing the relations between the variations in solar radiation and in the weather, based on the work of the Smithsonian Astrophysical Observatory on the solar constant of radiation, and a fourth revised edition of the Smithsonian Meteorological Tables, for which there is a continued demand.

Allotments for printing.—The congressional allotments for the printing of the Smithsonian report and the various publications of the branches of the Institution were practically used up at the close of the year. The allotments for the coming year ending June 30, 1921, are as follows:

For the Smithsonian Institution: For printing and binding the annual reports of the Board of Regents, with general appendices, the editions of which shall not exceed 10,000 copies	$10,000.00
(*Provided*, That the unexpended balance of the appropriation of $10,000 made for this purpose in the sundry civil act approved July 1, 1918, is hereby reappropriated and made available during the fiscal year 1921)	5,220.99
For the annual reports of the National Museum, with general appendices, and for printing labels and blanks and for the bulletins and proceedings of the National Museum, the editions of which shall not exceed 4,000 copies, and binding in half morocco or material not more expensive, scientific books and pamphlets presented to or acquired by the National Museum library	37,500.00
For the annual reports and bulletins of the Bureau of American Ethnology and for miscellaneous printing and binding for the bureau	21,000.00
For miscellaneous printing and binding:	
International Exchanges	200.00
International Catalogue of Scientific Literature	100.00
National Zoological Park	200.00
Astrophysical Observatory	200.00
For the annual report of the American Historical Association	7,000.00

COMMITTEE ON PRINTING AND PUBLICATION.

The function of the Smithsonian advisory committee on printing and publication is to consider all manuscripts offered for publication by the Institution or its branches. During the year 10 meetings were held and 93 manuscripts were passed upon. The membership of the committee is as follows: Dr. Leonhard Stejneger, head curator of biology, National Museum, chairman; Dr. George P. Merrill, head urator of geology, National Museum; Dr. J. Walter Fewkes, chief, Bureau of American Ethnology; Mr. N. Hollister, superintendent, National Zoological Park; and Mr. W. P. True, editor of the Smithonian Institution, secretary.

LIBRARY.

The Smithsonian library received during the year 6,995 volumes and pamphlets, distributed as follows: To the Smithsonian deposit in the Library of Congress, 4,019; to the Smithsonian office, Astrophysical Observatory, and National Zoological Park libraries, 428; and to the National Museum library, 2,548.

Continued use of the library's collection of works on aeronautics has been made by students of aeronautics, both of the United States and of foreign countries. Forty titles were added to the collection during the year. In the De Peyster collection, author cards have been made for the Napoleon series and for the works on British, German, and Italian history.

The work of the library has suffered from the fact that the appropriation for binding has not kept pace with the greatly increased cost. This has reduced the number of books bound during the year to 737, as compared with 1,322 in 1919 and 1,706 in 1918.

NATIONAL MUSEUM.

The congressional appropriation for the maintenance of the Museum has remained practically the same for many years, and as a result of the great increase, both in size and importance, of the collections, not only has it been impossible to undertake desirable new lines of work, but also existing work has been greatly hampered by the necessity of observing the strictest economy. The two most serious handicaps to the Museum in extending its usefulness to the people of the country are lack of space for proper exhibition of its valuable collections and an insufficient staff of expert curators. This ast has in several cases necessitated grouping wholly unlike diviions under one curator, with the result that the sections in which here is no specialist in charge must remain practically at a standtill.

In June, 1920, a small congressional appropriation made possible the establishment of the National Gallery of Art as an independent bureau under the administration of the Smithsonian Institution, instead of being as previously a part of the Museum, the change to take effect on July 1, 1920. Mr. W. H. Holmes, head curator of the department of anthropology in the Museum, will become director of the National Gallery at the beginning of the year.

The Freer Gallery of Art was brought nearly to completion during the year, and arrangements were made with the Office of Public Buildings and Grounds for the construction of driveways and the improvement of the grounds around the building. The collections have begun to come in from the executors of Mr. Freer's estate and are being stored in the building until the installation can be begun.

During the past year the Museum acquired a total of 216,871 specimens, classified as follows: Anthropology, 15,254; zoology, 101,554; botany, 35,211; geology and mineralogy, 22,400; paleontology, 40,000; division of textiles, 1,716; mineral technology, 627; mechanical technology, 97; and National Gallery of Art, 12. Four hundred and ninety-five lots of material were sent to the Museum for examination and report by members of the staff, and 4,306 duplicate specimens were distributed for educational purposes.

The great mass of material for the Museum's collection of objects relating to the World War filled the space allotted to it in the Arts and Industries Building and overflowed into the Natural History Building and the Aircraft Building. This great collection, made possible through the hearty cooperation of the War and Navy Departments, contains material relating to practically every phase of the war, both on land and sea. The Navy furnished much interesting material relating to submarine warfare and other naval activities during the war, and the War Department assembled and deposited in the Museum exhibits illustrating military operations in every branch of the service, including the Air Service, Ordnance, Chemical Warfare, Quartermaster, Engineer, Medical, and Signal Corps. A full account of this valuable and instructive collection is given in the report of the administrative assistant in charge of the Museum, in an appendix to this report.

Additions to the collections in the division of history include 226 complete uniforms of the types worn in the United States Army from 1776 to 1909; miscellaneous scientific apparatus used by Joseph Henry (1799–1878) during the latter part of his life, the gift of his daughter, Miss Caroline Henry; watches owned by Maj. Gen. George B. McClellan, United States Army; swords and other military relics of Maj. Gen. John R. Brooke, United States Army; and many other objects of historical interest and value.

In anthropology the most noteworthy accessions were some valuable ethnological material collected during the period of military occupancy of the Philippines; collections made by members of the staff of the Bureau of American Ethnology, and transferred to the Museum; and a collection of nearly a hundred objects of Christian and Buddhist religious art in wood, copper, bronze, and silver.

The department of biology showed very gratifying results both in number of specimens and in the scientific importance of the material received. Through the liberality of Mr. B. H. Swales, no less than 163 species of birds new to the Museum's collections were among the year's accessions and, with the continued assistance of Dr. W. L. Abbott, 240 mammals and 228 birds from Australia were received as a first installment of a collection being made there by Mr. Charles M. Hoy. A large number of specimens were received during the year as a result of the Collins-Garner French Congo expedition. The divisions of insects and mollusks received important additions, and the botanical material accessioned during the year included valuable collections from all over the world.

In geology there was a decided increase over the previous year, both in number of specimens and in their scientific value, including many thousands of specimens of minerals and invertebrate fossils received from the United States Geological Survey. The collection of gems was overhauled and reweighed, and a handbook and catalogue of them prepared, which was in press at the close of the year. One hundred sets of 85 specimens each of ores and minerals for distribution to schools were prepared.

The divisions of textiles and mineral technology received important additions, and the division of mechanical technology was entirely rearranged during the year in accordance with a new plan for making the exhibits more instructive to visitors.

The usual large number of meetings and lectures were held in the auditorium of the Natural History Building, including the annual meeting of the National Academy of Sciences. The total number of visitors during the year at the Natural History Building was 422,984 and at the Arts and Industries Building 250,982. The Museum library received during the year 1,932 volumes and 1,581 pamphlets, bringing the total number up to 56,617 volumes and 88,690 pamphlets. The publications of the Museum for the year were 3 volumes and 33 separate papers of the Proceedings; Bulletins 106 (text), 107, 108, and a small edition of 103; volume 21 of Contributions from the National Herbarium, and the annual report for 1919.

BUREAU OF AMERICAN ETHNOLOGY.

The purpose of the Bureau of American Ethnology is to contribute to our knowledge of racial culture and advance our appreciation of racial accomplishment with respect to the American aborigines and the natives of the Hawaiian Islands. Inasmuch as the material from which we may secure this knowledge is rapidly disappearing or being absorbed into modern life, it is urgent that the bureau carry on intensive work among the American Indians to preserve for posterity the unwritten literature, languages, customs, and material culture of these most interesting people. The results of these researches are published by the bureau, and its policy with regard to publications is that they should be of such a nature that they may be studied with profit by all intelligent persons and not so technical as to be of value only to a few specialists.

Among researches along special lines conducted by the staff of the bureau may be mentioned the study of the various fibers and foods used by the Indians with the view of discovering a possible adaptation of some of these aboriginal resources to the use of the white man. A series of researches and publications on the habitations of the Indian has been inaugurated in order that they might be better known and an accurate knowledge of them disseminated. Researches on the music of the Indians have been carried on with gratifying results, the themes having been incorporated in certain cases by modern musicians in their compositions. In cooperation with the National Park Service the bureau is engaged in the excavation and repair for permanent preservation of prehistoric ruins and cliff dwellings of the Indians in the national parks and other Government reservations, such as the Mesa Verde in Colorado. These reclaimed Indian dwellings and other structures have proved to be of the greatest educational value and popular interest. During the past year the bureau excavated and repaired two of these prehistoric structures on the Mesa Verde, known as Square Tower House and Painted House, which have already cast considerable light on the ethnological problems of the region.

Work was continued by members of the staff during the year on various publications in varying degrees of completion from manuscript to final proof, and in addition field work was carried on among the Oneida Indians, the Seneca, the Tanoan and Kiowan, the Fox, the Pawnee, the Papago, the Apache, and other tribes. Also a number of archeological researches were conducted, especially in Texas and in the southwestern United States.

One annual report and 4 bulletins were issued during the year, while 14 publications were in press in various stages of completion. The library of the bureau, to which 820 books were added during the year, now numbers over 23,000 volumes and 14,000 pamphlets.

INTERNATIONAL EXCHANGES.

The number of packages handled during the year by the International Exchange Service was 369,372, weighing 496,378 pounds, an increase of 98,512 packages and 204,460 pounds in weight over the preceding year. This large increase is due to the fact that shipments have been resumed to several countries with which relations were suspended during the war. Nevertheless the number of packages handled exceeded by over 27,000 the total during 1914, the last year before the World War.

Shipments are still suspended to certain countries where internal conditions are unsettled or with whom peace treaties have not yet been ratified by the United States. An exchange of publications has been inaugurated with the Czecho-Slovak Republic, and, as soon as conditions warrant, it is expected to take the same step with the Polish Government. The prompt dispatch of foreign exchanges was considerably hampered at times during the year by freight embargoes and marine strikes. Later, however, the official character of the exchange shipments put them among the classes of freight exempt from the embargoes.

The Exchange Service continues to be of use in securing for establishments in other countries collections of scientific or other documents in this country. As an instance of this service, considerable material bearing on American universities and on the methods of government in American municipalities was collected and forwarded to the counselor in charge of foreign relations of the municipality of Prague, at his request.

For transmission to foreign countries there were received during the year 56 full sets of United States official publications and 37 partial sets, in exchange for which this country receives the official publications of these various countries. Two new depositories to receive the official documents were added during the year, Czecho-Slovakia to exchange full sets and the State of Rio de Janeiro, Brazil, partial sets.

NATIONAL ZOOLOGICAL PARK.

The congressional appropriation for the maintenance of the National Zoological Park was the same for the past fiscal year as for the preceding year, and with the constantly increasing cost of practically all supplies used at the park it was impossible to spend more than a small part of the amount for repairs and improvements. Only the most urgent of the needed improvements were completed, among them a public-comfort station at the Harvard Street entrance; nine new inclosures of iron framework covered with heavy mesh wire for strictly outdoor animals, such as pumas, leopards, lynxes, and others; and some necessary minor improvements, such as new concrete steps, drainage gutters, and new fences.

Popular interest in the park continues to increase, the total number of visitors during the year being 2,229,605, the largest yearly attendance ever recorded. The educational value of the zoological collection is emphasized by the fact that 98 schools and classes, comprising about 9,000 individuals, visited the park during the year.

The number of animals in the collection at the close of the year was 1,427, representing 419 species. Of this total, 496 were mammals, 847 birds, and 84 reptiles. While this number is 124 under the record year, nevertheless the monetary and scientific value of the collection is much greater than ever before. Specially interesting among the 127 animals presented to the park during the year were a number of accessions from South America, including the rare black-headed ouakari monkey, two snowy egrets, a scarlet ibis, a specimen of the rare matamata turtle, a white-backed trumpeter, the most important addition to the bird department during the year, a Mexican kinkajou, and other rare South American species. The most interesting among the animals born in the park is a hippopotamus, which attracts much attention from visitors.

It is gratifying to be able to report that the sundry civil act for 1921 carries an appropriation of $80,000 for the purchase of a frontage of 625 feet on Connecticut Avenue, which will enable the park to have a dignified approach at this important entrance without the danger of encroachment by private dwellings or other buildings. Among the important needs of the park the superintendent mentions, in an appendix to this report, a suitable public restaurant for the increasing number of visitors, the purchase of a narrow strip of land between the park boundary and Adams Mill Road near the southeastern entrance, outdoor inclosures for lions, tigers, and certain other animals, and increased compensation for certain of the employees, particularly keepers and policemen.

ASTROPHYSICAL OBSERVATORY.

The work of the observatory at Washington consisted largely of preparation of tables of results for publication in Volume IV of the Annals of the Astrophysical Observatory, and of reducing the 1919 observations made at Mount Wilson and comparing them with those obtained by the Smithsonian observers in Chile. The agreement between the two sets of results, after allowing for systematic errors, was excellent, the average deviation of the two stations for 50 values obtained on corresponding days being only 0.013 calories, or 0.65 per cent. A remarkable confirmation of the variation of solar radiation on the earth was given by photo-electric observations on the planet turn by Dr. Guthnick, of the Berlin-Babelsberg Observatory. Va-tions in brightness of that planet were shown which were found be in almost exact correlation with variations of the solar radiation the earth as observed at Calama, Chile. This comparison indicates at the variation of the solar radiation is due to rays from the sun unequal brightness, which, rotating with the sun, strike the various anets successively in the order of their longitudes, and fall one after e other upon the earth as the sun by rotation brings them into line th us.

A new instrument for measuring nocturnal radiation, devised by essrs. Abbot and Aldrich and constructed at the observatory in-ument shop, was successfully tried during the year. It is pro-sionally called the "honeycomb pyranometer." The instrument is most as sensitive as a flat blackened strip and moreover, has the luable property of being fully absorbing, which a strip has not. is an instrument of great promise for standard measurements of rious kinds of radiation.

Through the generosity of Mr. John A. Roebling, of New Jersey, was made possible to move the Smithsonian observing station pre-ously located on the plain near Calama, Chile, to a near-by mountain ove the interference of dust and smoke. With the remainder of r. Roebling's grant, it is proposed to establish a new observing sta-n on the Harqua Hala Mountain in Arizona, one of the most oudless regions in the world. The establishment of these two sta-ns, so widely separated from one another, will make it possible obtain nearly every day in the year check observations of the solar nstant of radiation, laying a firm foundation of solar observa-ns from which meteorologists will be able to determine whether the riations in the sun are of value, as present results indicate, in fore-sting weather conditions. However, with the limited funds at his sposal, Dr. Abbot found it necessary to transfer apparatus from the ount Wilson station to the new Harqua Hala station, and he urges his report that Congress appropriate sufficient money to provide r independent observing equipment for both stations and for eded improvements to the Arizona station.

INTERNATIONAL CATALOGUE OF SCIENTIFIC LITERATURE.

The United States Regional Bureau of the International Catalogue Scientific Literature is intrusted with the duty of collecting, in-xing, and classifying titles of all scientific papers published in e United States to form part of the International Catalogue issued a central bureau in London.

The enterprise was begun in 1900 and published annually 17 volumes up to 1913. Fifteen volumes for the year 1914 have been printed and much of the material for the fifteenth issue is now in the hands of the central bureau, its publication being delayed by financial difficulties brought about by the war. A conference has been called by the Royal Society in London, September 28 next, to consider the future of the catalogue and to discuss means for meeting this financial deficit.

The aim and purpose of the International Catalogue was to meet the demands of scientific workers for an annual authors' and subject catalogue to the current literature of science. A general revision of the classification schedules which form the key to the subject catalogues is now needed and, in view of the present apparent demand for abstract journals, it is to be hoped that when these improvements are considered arrangements may be made to cooperate with the bodies now preparing and publishing abstracts to scientific literature.

It would seem that the pressing demand for such abstract journals, now evident in the United States, should be recognized internationally. This Institution would, therefore, favor any feasible plan to bring the present influential organization of the International Catalogue of Scientific Literature, already recognized and supported by practically all the countries of the world, into close cooperation with existing abstract journals and to encourage the establishment of abstract journals covering those branches of science not already represented.

OBITUARY.

STEPHEN C. BROWN.

Stephen C. Brown, who for more than 40 years had held the position of registrar of the National Museum, died on July 11, 1919. At a meeting of his associates in the Smithsonian and Museum held the following day, many of Mr. Brown's friends expressed the high esteem and admiration in which he had been held and their sorrow at his loss.

R. LUTHER REED.

R. Luther Reed, an employee of the Institution since 1880, died on April 26, 1920. He was foreman of the Museum carpenter shop until the Zoological Park was established, where he served until brought back to the Institution by Secretary Langley to work on his aerodromes. Mr. Langley has expressed in his publications his appreciation of Mr. Reed's skill and efficient service in that connection.

Respectfully submitted.

Charles D. Walcott, *Secretary.*

APPENDIX 1.

EPORT ON THE UNITED STATES NATIONAL MUSEUM.

SIR: I have the honor to submit the following report on the opera-
ns of the United States National Museum during the fiscal year
ding June 30, 1920.

The year witnessed very little change in the organization of the
ited States National Museum. The congressional appropriations
r the maintenance of the Museum remaining practically stationary
r many years has not only prevented the Museum from engaging
new lines of work offering exceptional opportunities at this time
t has allowed it to carry forward existing work only by the use
the strictest economy. The Museum has been unable to add even
few of the experts needed to assist in the classification of specimens
the recently organized department of arts and industries as well
in the long-established natural history departments, nor has it been
le to make any general advancement of salaries though greatly
eded. The insufficiency of funds precludes separate staff officers
r the various sections or divisions of the work, these various activi-
s having of necessity to be placed under those curators in other
es best qualified to also handle the subjects. Thus, for instance, for
ministrative purposes only, the division of medicine and the sec-
n of wood technology are under the general supervision of Mr.
L. Lewton, who is the curator of textiles, and Dr. Walter Hough,
rator of ethnology, has general oversight of various other collec-
ns where there is no paid staff, especially the art textiles, ceramics,
sical instruments, and the period costume collections. This ar-
ngement is far from ideal, but it holds collections together until
ans are available for the needed additional experts. The item for
eservation of collections, from which the scientific and clerical
ffs, the watch and cleaning force, freight and cartage, and pre-
rvatives are paid, was last increased 10 years ago, just as the Museum
s taking possession of the Natural History Building. Since then
proximately 3,000,000 specimens have been added to the Museum.

After the death of Mr. S. C. Brown the position of registrar of
e Museum was abolished and a reorganization of the work made.
e records relating to accessions, material for examination and
port, and to distribution of specimens were transferred to the office

of correspondence and documents, where the files of the Museum are kept, and the duties of shipping clerk were combined with those of property clerk.

The collections of echinoderms were removed from the division of marine invertebrates, a separate division of echinoderms being established and Mr. Austin H. Clark promoted from assistant curator of marine invertebrates to curator of echinoderms and placed in charge. As he had devoted much time to the onychophores, they were included in the new division. At the close of the year the division of graphic arts was transferred from the department of anthropology to that of arts and industries.

The sundry civil bill for 1921 carries a small appropriation for the National Gallery of Art. For economic reasons the gallery has up to now been administered as an integral part of the Museum, the scientific and administrative staffs of which have cared for the gallery in addition to their own regular Museum duties. This appropriation will permit of the gallery being separated from the Museum on July 1, 1920, and organized as an independent bureau under the Smithsonian Institution, and to it will be transferred the fine art collections of the Museum which have heretofore been administered under the curator of the National Gallery of Art. The gallery will for the present, however, continue to be housed in the Natural History Building of the Museum.

The year has witnessed the bringing together here of large war collections, made possible by the hearty cooperation of the War and Navy Departments. Besides supplying the objects, they transported them without cost to the Museum, set them up in the Museum buildings, and in many instances detailed officers and men to assist in labeling and otherwise preparing them for exhibition.

COLLECTIONS.

The total number of specimens acquired by the Museum during the year was approximately 216,871. Received in 1,480 separate accessions, they were classified and assigned as follows: Department of anthropology, 15,254; zoology, 101,554; botany, 35,211; geology and mineralogy, estimated, 22,400; paleontology, estimated, 40,000; textiles, woods, medicines, foods, and other miscellaneous animal and vegetable products, 1,716; mineral technology, 627; mechanical technology, 97; and National Gallery of Art, 12. Loans and deposits for exhibition added 8,348 more, chiefly in the division of history, war collections.

Material to the extent of 495 lots was received for special examination and report. While this free identification of material sent in from all parts of the country requires considerable time on the part of specialists, it is not without advantage to the Museum in furnishing occasional desirable specimens and in recording new localities.

The distribution of duplicates for educational purposes, mainly to schools and colleges, aggregated 4,306 specimens.

Material sent out to specialists for study on behalf of the Museum amounted to 13,838 specimens, mainly biological.

War collections.—Through cooperation of the Navy and the War Departments, the stream of material reaching the Museum illustrative of the World War filled the quarters assigned to the division of history in the Arts and Industries Building, overflowing into the Natural History Building and the Aircraft Building.

Prior to July, 1919, very little material had been received illustrating the work of the Navy during the World War, with the exception of some uniforms of the Marine Corps and the insignia of its various branches. At that time it was decided to assign the rotunda of the Natural History Building for this purpose, and Lieut. Commander L. P. Warren was designated on the part of the Navy Department to take charge of this work. A number of exhibits were received during the year, the most important of which are a paravane, which is a device attached to battleships for the purpose of destroying mines; an anti-aircraft gun and a Y depth charge gun for destruction of submarines; a collection of British naval airplane bombs, a large number of relics from the sunken battleship *Maine*, a 1-pound gun, a German torpedo 18 feet long, a Davis gun for airplanes, a naval range finder, and the large 6-inch naval gun which fired America's first shot in the World War. Owing to its great weight this gun was placed on the east driveway, where it makes a most impressive exhibit.

The War Department continued its generous cooperation by contributing material illustrating the military activities of the United States, the Allies, and the enemy countries in the following branches: Air Service, Ordnance, Chemical Warfare, Quartermaster, Engineer, Medical, and Signal Corps. The material was selected especially for the Museum with a view to illustrating graphically the military history of the war for the benefit of the public and for historical and scientific research.

From the Air Service came military airplanes showing types of machines used by the United States, France, and Germany, including a De Haviland-4, tractor biplane of type originally developed by England and later adopted by the United States for observation and day bombing purposes; a Le Pere tractor biplane of type developed by the United States Air Service during the war for fighting purposes; a Martin bomber, twin tractor biplane of type developed by United States Air Service for bombardment purposes; a Spad, XVI, tractor biplane of type developed and used by French for reconnaissance purposes; another Spad, XIII, tractor biplane of type developed and used by France. This airplane, which was part of the Twenty-second Aero Squadron, Air Service, American Expeditionary Forces, has seven victories to its credit, and is of the same type as those with which the famous French flyers Fonch and Guynemer and the American flyer Rickenbacker made a great part of their records; a Fokker, D–VII, tractor biplane developed and used by the German air service for pursuit purposes. This plane was captured at Verdun by Capt. H. McLanahan and Lieuts. E. Curtis and S. Sewall, of the First Pursuit Group, Ninety-fifth Aero Squadron, United States Army, Capt. J. Mitchell commanding.

The Ordnance Department and the Quartermaster Corps supplied ordnance equipment of the type used by the various armies for offensive and defensive purposes, small arms of type used by the United States during the war, rifles, pistols, and swords illustrating the types of weapons used during the World War by the various armies, including the rifles used by the armies of Austria, Belgium, England, France, Japan, Italy, Germany, Russia, Roumania, and Serbia. Of more than passing interest were specimens of silk cartridge cloth used by the United States Army for powder bags for loading the large guns and samples of the same material adapted for civilian use.

Of enemy material the Ordnance Department transmitted a large and interesting collection of German and Austrian equipment captured by the American Expeditionary Forces. This included field, machine, anti-aircraft, and anti-tank guns; field kitchen; various other vehicles, and miscellaneous commissary, infantry, artillery, cavalry, and signal equipment, some made of paper.

From the Chemical Warfare Service came offensive and defensive equipment used in the chemical warfare by both the armies of the allied and enemy countries, including shells, bombs, projectiles, smoke producers, masks, special clothing, and alarm; in each case also nearly complete series showing the development of such objects from their earliest form to the most recent.

The Corps of Engineers contributed a collection illustrating the important part played in modern warfare by that branch of the Army, including examples of tools and small equipment and of the large instruments peculiar to the work of the corps which so greatly aided in winning the war. Particularly interesting are a parabolic listening device; sound and flash ranging sets for locating the position of enemy batteries; examples of the high-intensity electric-arc and the open-type searchlights; models showing the use of camouflage material in trench warfare with dummy silhouettes of soldiers to draw machine-gun fire; representation of standard type trench and shelter-cave chamber; models of bridges, pontoon boats, and wagons, and a camouflaged-gun position.

Other contributions, through the Quartermaster Corps, added uniforms and insignia fully representing the uniform and individual personal equipment worn by officers and enlisted men of the following countries and the colonial possessions of each: Belgium, France, Great Britain, Italy, Japan, Austria, Germany, and Turkey. This series forms a marvelously complete collection, and will be a priceless source of information for historical purposes.

The Medical Department completed the extensive series begun last year of objects illustrating the work of that branch of the United States Army, and it was duly installed this year under the supervision of Mr. F. L. Lewton. The field equipment included first-aid kit and emergency belt worn by all enlisted men in the Medical Corps, field operating table, instruments, dressings, and other supplies, complete portable and the emergency dental outfit for carrying in hand, field kitchen, disinfector, sterilizing outfits, litters, ambulances, etc. The base hospital material for exhibition was grouped as follows: The X-ray laboratory, showing all important fixed and movable types of X-ray equipment; the hospital ward of three beds, with various equipment; general operating room of a military hospital; anæsthesia room; eye, ear, and throat clinic; fracture room; dental clinic; sterilizing room; bacteriological laboratory; serological laboratory; pathological laboratory; and chemical laboratory.

The pictorial material of the war collections was increased by a series of nearly 500 drawings and paintings by the official artists of the American Expeditionary Forces, which were installed in rooms 45, 46, and 47 of the Natural History Building. To the numismatic section of the war collections was added a collection of representative war decorations and medals of Great Britain, France, Italy, Germany, Austria, and Turkey, and a series of bronze and silver commemorative medals issued by Belgium, France, Great Britain, Greece, Holland, Italy, Montenegro, Roumania, Russia, and Serbia in commemoration of notable events during the war.

The National Society of the Colonial Dames assisted also in building up the war collections by lending a very interesting and striking series of uniforms of the types worn by American women members of war organizations.

The space assigned to the war collections was increased early in the year by two large ranges on the ground floor of the Natural History Building. In one was installed the collection of foreign uniforms, insignia, and decorations worn by the armies of the Allies and the enemy countries and the captured German military equipment, for which the Museum was indebted to the Quartermaster General of the United States Army, Maj. Gen. H. L. Rogers. In the second range were placed the collections of chemical warfare and ordnance material. The west and central portion of the foyer of this building was given over to the Corps of Engineers for its exhibit; a portion of the foyer and three rooms on the east to the exhibit of the Medical Department; and the walls of three rooms on the west of the foyer to the pictorial material. In the Arts and Industries Building were placed on display captured German ordnance material, small arms of the Allies and enemy countries, American ordnance equipment, and the collection of uniforms worn by the women's organizations. Out of doors, on the west side of this building, were placed the German field guns, and the airplane exhibit is being assembled in the Aircraft Building.

The War Department rendered great assistance in putting this material on display, without which the Museum could have made little progress, the small force of the division of history being entirely inadequate to the huge task. Special credit is due to Capt. J. J. Hittinger, of the Quartermaster Corps, who continued on detail to the Museum throughout the year, giving general supervision to the assembling and installation of material; to Maj. John McLaren in connection with the ordnance section; to Capts. E. W. Jepson and J. E. Costello and Sergt. Burns A. Stubbs under Lieut. T. N. Ellman as to material from the Corps of Engineers; and to Capt. A. P. Mooradian, who planned and supervised the wiring and setting up of the equipment of the X-ray laboratory in the exhibit of the Medical Department, all of which is operative.

History.—In other lines than the war collections the Museum acquired much material of value and interest. In American history the additions included a large collection of uniforms of the types worn by the armies of 23 foreign countries prior to the World War; 226 complete uniforms of the types worn in the United States Army from 1776 to 1909; material relating to the career of Cyrus W. Field and the laying of the first Atlantic telegraph cables; miscellaneous scientific apparatus used by Joseph Henry (1799–1878) during the latter part of his life, the gift of his daughter, Miss Caroline Henry; watches owned by Maj. Gen. George B. McClellan, United States Army; swords and other military relics of Maj. Gen. John R. Brooke, United States Army; mementoes of Susan B. Anthony and objects illustrating the history of the women's suffrage movement in the United States from 1848 to 1919; and, for the series of costumes of mistresses of the White House, a black velvet dress worn by Mrs. Woodrow Wilson, and a lace flounce completing the inaugural dress of Mrs. James A. Garfield. The philatelic material was increased by

5,872 specimens, of which 4,345 were transferred from the United States Post Office Department, and of these 2,475 are examples of new issues reaching that department from the International Bureau of the Universal Postal Union.

Anthropology.—The small number of accessions received in the division of ethnology shows markedly the rapid decline of Indian material and a corresponding though less rapid disappearance of material from races less modified by contact with the white man. The receipts included western Indian baskets donated by Miss Ella F. Hubby; valuable material collected during the period of military occupation of the Philippines received as gifts from Mrs. Thomas F. Dwyer and Miss Kline, Gen. Joseph C. Breckenridge and the late Lieut. Col. Duncan Elliott, United States Army; and pottery and objects in silver, pewter, and brass bequeathed to the Museum by Miss Elizabeth S. Stevens.

The division of American archeology reports its yearly increase due largely to contributions from the Bureau of American Ethnology, including collections made in Arizona, Utah, and Colorado by Dr. Walter Hough; in Texas by Dr. J. W. Fewkes and Prof. J. E. Pearce; in Missouri by Mr. Gerard Fowke; and in Utah by the curator, Mr. Neil M. Judd. The bureau also transferred a collection of archeological specimens obtained by it as a gift from the Otto T. Mallery expedition.

The collections in Old World archeology benefited, too, by the bequest of Miss Elizabeth S. Stevens, receiving nearly a hundred objects of Christian and Buddhist religious art in wood, copper, bronze, and silver. Other additions included ancient coins from Capt. Clarence L. Wiener; casts of engraved antique gems from Dr. William H. Dall; and casts of oriental seals made in the Museum from originals owned by Mrs. Talcott Williams. The collection of Bibles was supplemented by the two copies of the New Testament in English from which Thomas Jefferson cut the English version of his The Life and Morals of Jesus of Nazareth, the so-called Jefferson Bible, donated by Miss Bertha Cohen and her nieces.

In physical anthropology the most important accessions were skeletal material, as follows: From New Mexico, gift of the Museum of the American Indian, Heye Foundation; from Nevada, donated by Hon. William Kent; from Tennessee and Kentucky, partly gift and partly a loan from Mr. W. E. Myer; and from Missouri, collected by Mr. Gerard Fowke; and from Arizona, collected by Dr. Walter Hough, transferred to the Museum from the Bureau of American Ethnology. A Neolithic skull was received in exchange from the University of Liege, Belgium, and a plaster bust representing a form of early man by purchase. The trip of the curator, Dr. Aleš

Hrdlička, to the Far East added to the collections some 2,000 portraits of peoples of that locality.

Mr. Hugo Worch contributed 3 pianos and a harpsichord to the series he is building up here representing the history of the pianoforte, and from Mrs. J. Ryan Devereux came a noteworthy collection of 81 musical instruments of various types.

The additions in graphic arts included a collection of several hundred specimens of wood engravings, mezzotints, aquatints, etc., donated by Mr. Earle W. Huckel; miniature mosaics from Mr. Stockton W. Jones, showing a method of making pictures not heretofore represented in the division; sephiograph reproductions from the Crane Lithograph Co.; and American-made vellum from Mr. George A. Hathaway. The section of photography was enriched by photographic apparatus used by Edward Muybridge in his study of motion in animals, presented by the Commercial Museum of Philadelphia.

In the ceramic gallery loans were credited from Miss E. B. Lowe of old English porcelain, and from Miss Eliza Ruhamah Scidmore of Japanese porcelain and bronze.

Biology.—The additions to the biological collections aggregated approximately 136,765 specimens. Not only was the year numerically a very prosperous one, but the reports of the curators show a gratifying increase in the scientific importance of the material received. This is particularly true of the division of birds, in which no less than 163 species new to the collection were among the accessions. This splendid result was to a great extent due to the liberality of Mr. B. H. Swales, of Washington, D. C., who placed a fund at the disposition of the Museum for this particular purpose. No less important was the material received through the continued generosity of Dr. W. L. Abbott. Impressed by the importance of securing for the Museum an adequate representation of the fast disappearing higher vertebrate fauna of Australia, he granted the means to send Mr. Charles M. Hoy to that Continent for the purpose of collecting especially mammals and birds. No less than 240 specimens of the former and 228 of the latter from a region hitherto very poorly represented in the national collection are contained in this first installment. Dr. Abbott's personal explorations in Haiti have also yielded very important additions. A third expedition was of particular interest as supplementing our African collections, which were hitherto confined chiefly to the eastern side of the Continent, viz, the Collins-Garner expedition to the French Congo. More than 2,350 mammals, birds, reptiles, fishes, and invertebrates were thus added, among them 2 gorillas, 2 chimpanzees, 2 buffalos, etc. The first installment from another African expedition, carried out by the Institution in conjunction with the Universal Film Co., contained 239 mammals and birds from southern

Africa, still further contributing to the excellency of our series from the dark continent.

Among the large collections of insects acquired, the following are especially noteworthy: Mr. B. Preston Clark presented 5,500 lepidoptera of the Hawaiian Islands and South America. Similarly Dr. William Barnes donated 2,000 moths, including 60 types, and 150 butterflies. From Dr. W. M. Mann, through the Bureau of Entomology, the Museum received 6,000 insects of various orders, collected by him in Honduras, and similarly from Dr. E. A. Schwarz a collection made in Florida of 5,770 miscellaneous insects. Besides 6,930 specimens transferred by the Department of Agriculture, numerous accessions were received from Costa Rica, Australia, South Africa, Mexico, etc.

The mollusk collection was the recipient of two particularly valuable and important gifts, namely, the collection of Hawaiian marine shells donated by Mr. D. Thaanum and a part of the William F. Clapp collection of New England land and fresh-water mollusks, about 10,000 specimens purchased and presented by Mr. John B. Henderson. The former, consisting of about 5,000 specimens collected by Mr. Thaanum and Mr. J. B. Langford, has long been known as the best existing collection of authentically located marine Hawaiian shells. As in previous years, the Bureau of Fisheries forms one of the chief sources of our material of marine invertebrates, including specimens collected during the cruises of the *Albatross* and the *Bache* reported on by Mr. Sasaki, Dr. A. L. Treadwell, and Dr. H. B. Bigelow. Numerous other accessions from collectors and collaborators were remarkable for the great number of types of new species added during the year.

The botanical collections accessioned include highly valuable material from all over the world. Besides important North American collections, there are represented plants from Mexico and Central America, Colombia, British Guiana, Brazil, Argentina, Europe, Africa, China, Sumatra, etc. The Department of Agriculture transferred 8,190 specimens, mostly the result of field work of the Bureau of Plant Industry. The Forestry Commission of the Mexican State of Sinaloa transmitted 887 specimens from little known parts of that State. A large number of plants were obtained in exchange, the largest lot consisting of 2,398 specimens received from the New York Botanical Garden, mostly plants collected in Colombia by Rusby and Pennell. Likewise in exchange there were acquired from the Botanical Museum of the University at Copenhagen 923 specimens of Mexican and Central American plants, chiefly material collected a long time ago by Liebmann and Oersted, and therefore of unusual historical interest and value.

Geology.—The additions to the collections in the department of geology during the year were 180 lots against 135 for the year previous, with a decided increase in the number of specimens and their scientific value. Of these accessions, 111 were gifts, 32 transfers, 25 exchanges, 2 were collections by members of the force, 1 received as a deposit, and but 9 acquired by purchase. Among those of greatest importance were gifts comprising ores of the rare metals, particularly tungsten and molybdenum, secured chiefly through Mr. Frank L. Hess, of the United States Geological Survey, an honorary custodian in the Museum. The donors included Mr. C. W. Purington, Vladivostok, Siberia; Mr. J. G. Hibbs, Denver, Colo.; the Homestake Mining Co., Lead, S. Dak.; the R. & S. Molybdenum Co., Questa, N. Mex.; and the Molybdenum Mines Co., Denver. Other important additions were made by Dr. J. Morgan Clements, of New York, traveling in China in the interest of the Federal Trade Commission, and Mr. M. L. Patterson, manager of the Thabawleik Mines, Mergui, Burma.

An excellent series of crystallized native copper and silver minerals from the Lake Superior region was acquired by purchase and gift, and a large slab of native copper, simulating in outline the continent of South America, was received from the Bolivian delegates to the Second Pan American Financial Conference.

The meteorite collection was enriched by examples of the following stones: Colby, Wis., 3,642 grams; Bjurbole, Finland, 2,500 grams; Washington County, Kans., 2,003 grams; Kesen, Japan, 1,397 grams; and Appley Bridge, 598 grams. In addition there was acquired 3,320 grams of an iron from Yenberrie, Australia.

Valuable collections in the form of minerals and invertebrate fossils, comprising many thousands of specimens, were received from the United States Geological Survey, as was also a large series of igneous rocks from the Yellowstone National Park, described by Dr. J. P. Iddings in volume 32 of its monographs.

Large collections from the West Indies, particularly from the Dominican Republic, have been added to the series of invertebrate fossils, which have been further augmented by some 10,000 specimens from the Upper Cambrian of Wisconsin.

To the exhibition series have been added a large and unique specimen of trilobite, the largest American form in existence, which was found during excavations in connection with the conservancy dam at Dayton, Ohio; a mounted skeleton of the large, extinct mammal, *Brontotherium hatcheri;* the sea-living lizard, *Tylosaurus proriger;* and a diminutive camel *Stenomylus hitchcocki.* The study collections in vertebrate paleontology were augmented by a considerable number of type specimens, deposited by the Maryland Geological Survey, which, though fragmentary, are of primary interest. Of equal importance are gifts of Pleistocene bones and teeth from a cave near Bulverde, Tex., donated by Dr. O. P. Hay, and similar material from Cavetown, Md., gift of Phillips Academy, Andover, Mass.

The gem collection has been thoroughly overhauled, reweighed, and recatalogued, and a handbook and catalogue of the same prepared, the manuscript of which is now in the hands of the Government Printer.

The work of preparing 100 sets of 85 specimens each of ores and minerals for distribution to schools, mentioned in the report of last year, has been completed and the sets are now ready as occasion shall demand.

Textiles.—The collections under the supervision of the curator of textiles, which, besides textiles, embrace medicine, food, wood technology, and miscellaneous animal and vegetable products, were increased by many gifts and by transfer from other Government bureaus amounting to about 2,000 objects. The most important of these are as follows: The division of textiles received for exhibition from the Department of Ordnance, War Department, specimens of the silk cartridge cloth which was so essential in the preparation of separate loading ammunition for all the large guns taking part in the World War; also examples of this same fabric showing the results of the experiments made to demonstrate the value for civilian uses of the 11,000,000 yards sold as surplus material. There were added by gift many specimens of knitted fabrics contributed by American manufacturers, and made from artificial silk, wool, and mohair.

Medicine.—The collections in the division of medicine were enlarged by a series of pharmaceutical preparations illustrating the various forms in which medicinal substances are prepared for administration, a series of essential oils, and an addition to the materia medica collections of a large number of inorganic chemicals. The exhibits planned to illustrate the basic principles of different schools of medicine were increased by many gifts, and the one devoted to homeopathy completed. The section of pharmacy received many documents and publications bearing on the history of the United States Pharmacopoeia and the complete series of written and printed records of the last revision of this important work, amounting to many thousands of pages.

Wood technology.—The exhibition collections of the section of wood technology were much improved by a transfer from the Forest Service of 25 colored transparencies and 48 colored bromide enlargements specially prepared for the National Museum, representing typical forest scenes, methods of lumbering, and forest industries, and by the gift of exhibit material illustrating the use of wood waste and wood pulp.

Animal and vegetable products.—Many specimens of edible and inedible oils developed as a branch of the meat-packing industry, and samples of the official tea standards used from 1915 to 1920 to control the quality of the foreign teas imported by the United States were added to the collections of animal and vegetable products.

Mineral technology.—In the division of mineral technology the principal addition was a working model of a salt works, donated by the Worcester Salt Co., being a replica of that company's operations near Warsaw, N. Y. A system of circulating water is caused to mine the native salt, bring it in solution to the surface, and finally to surrender it, the whole taking place before the visitor's eyes. The National Lead Co. contributed 26 large transparencies and about 600 exhibition samples needed in completing the comprehensive exhibit illustrating the lead industry undertaken several years ago and which now lacks only competent technical direction in installation. The work of the division was largely at a standstill by the transfer elsewhere in the Museum at the beginning of the year of one of the members of its scientific staff and the resignation soon afterwards of the remaining two members. Mr. Gilbert, after severing active relations, continued under appointment on an honorary basis to give advisory supervision over these collections, all of which had been developed under his direction. It is hoped another year will find this division manned and again to the front, as it was so signally during the period of the war.

Mechanical technology.—Probably the most important addition to the collections of the division of mechanical technology during the year was a 12-cylinder Liberty airplane motor, the gift of the Lincoln Motor Co., various portions of which are cut away to show the interior parts in operative relation. Another accession of note was a replica of the original typographer, invented and patented by William Austin Burt in 1829, donated by his grandson, Mr. Hiram Austin Burt. As representative of the early beginnings of the American typewriter this forms a very important addition to the exhibit, showing the development of the typewriter. The timekeeping collections were enhanced by the gift of two watches from Mr. George W. Spier, honorary custodian of watches. In the section of marine transportation there was added a model of one of the freight ships built at Hog Island Shipyard in 1919, received from the United States Senate Committee on Commerce, through Senator Wesley L. Jones, chairman.

Early in the year plans for the future development of the division of mechanical technology were formulated, the end in view being a museum of engineering. Accordingly, the collections in care of the division were first rearranged in the halls, the basis of rearrangement being the kind of object rather than the source; thus, one hall now includes all objects relating to land and aerial transportation; another hall, marine transportation; and another hall, metrology and mechanical transmission of intelligence.

NATIONAL GALLERY OF ART.

The National Gallery of Art—the department of fine arts of the Museum—continued in charge of Dr. W. H. Holmes, as curator, the collections occupying mainly the central skylighted hall on the first floor of the north wing of the Natural History Building. The additions while not numerous comprised works and objects of very considerable museum value, not, however, comparable in importance with the accessions of the year before. Of the works of painting and sculpture added, the most noteworthy, perhaps, was a statue in white marble of the Earl of Chatham (William Pitt), by Francis Derwent Wood, R. A., the gift of the Duchess of Marlborough and other American women in Great Britain.

During the year four paintings were purchased from the Henry W. Ranger fund, two of which, Grey Day, by W. Granville-Smith, N. A., and Evening Tide, California, by William Ritschel, N. A., are now on view in the gallery; the others are The Rapids, by W. E. Schofield, N. A., deposited in the Brooklyn Museum, and the Orange Bowl, by Anna Fisher, the assignment of which has not yet been announced. It is gratifying to know that by this bequest the gallery is assured of a number of worthy additions each year.

During the year the Rev. Alfred Duane Pell continued to add to his collection of art objects presented and lent to the Museum and installed in the long room at the north end of the gallery. The installation was not complete at the close of the year.

The preparation of a catalogue of the gallery bringing the record up to date was carried to practical completion. The last issue of the catalogue, prepared by Assistant Secretary Rathbun, is dated 1916, and it is regarded as important that a new edition be printed as soon as practicable.

It is a matter of particular felicitation that in June Congress granted a fund sufficient to permit the organization of the Gallery as a separate unit of the Smithsonian foundation and to provide a modest curatorial staff, thus relieving the Museum of a rapidly growing burden and at the same time affording the long-delayed opportunity of laying the foundation requisite to a reasonable and symmetric development of the Nation's Gallery of Art.

FREER COLLECTIONS.

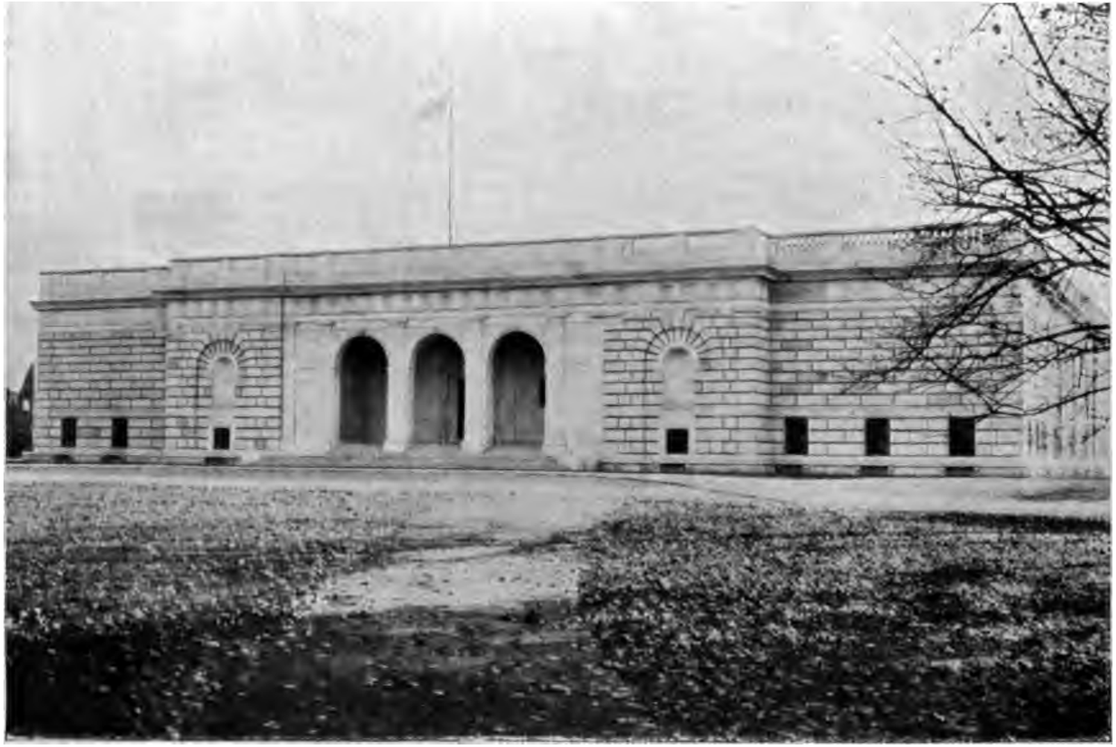
The death of Mr. Freer this year is a great loss to the art interests of the country. In presenting his collections of American and oriental art to the Smithsonian Institution in 1906, Mr. Freer stipulated that they should remain in his possession during his life, and at that time he provided in his will $500,000 for the erection by the Smithsonian Institution of a suitable building for housing them, near the National Museum. He reserved the right to add to the collections, and in the intervening years he has about tripled the number of objects originally transferred by title to the Institution. Increasing the building fund to $1,000,000 and waiving the original conditions, Mr. Freer in 1915 decided upon the early erection of the structure and the transfer of the collections to Washington. The building, now nearing completion, was accordingly begun in the autumn of 1916. That Mr. Freer was not permitted to see the consummation of his plans for the development of the art interests of the country is greatly deplored. His experience and advice would be invaluable in inaugurating this independent unit of the National Gallery of Art which he so generously provided. The building and collections represent an outlay of some six or seven million dollars and constitute one of the most important and valued donations which any individual has ever made freely and unconditionally to the Nation.

During the year the building for the Freer collections was brought nearly to completion, despite delays now characteristic of the building business. The central court was carefully laid out with walks, gardens, and fountain. Arrangements were made with the officer in charge of public buildings and grounds for laying out the driveways to the building and otherwise improving the grounds immediately surrounding it.

The Peacock room, that celebrated decoration executed by Whistler as a setting for his painting La Princesse, was transferred from the residence of Mr. Freer in Detroit and set up complete in a room specially designed for its reception at the southeastern corner of the building. By the close of the year the executors of Mr. Freer's estate had commenced to ship to Washington other portions of the Freer collections, which will be stored in the various storage quarters in the building until the structure is entirely completed and the installation of the collections can be undertaken.

THE LOEB BEQUEST.

Prof. Morris Loeb, the eminent chemist, who died on October 8, 1912, left a bequest of $25,000 to the American Chemical Society, to be held as a special fund, the income of which should be used for the establishment or maintenance of a chemical type museum, either in



THE FREER GALLERY OF ART.

nection with the Chemists' Club of New York City, or the Na-
al Museum in Washington, or the American Museum of Natural
tory in New York City, preference to be given in the order named.
chief object of the museum was to be the preservation of all new
stances described as the result of chemical research, either by ob-
ing the same by gift or purchase from the discoverer or by caus-
the same to be prepared in sufficient quantity according to the dis-
erer's published directions—all for the purpose of facilitating
parison by subsequent observers.

he Chemists' Club of New York accepted the trust, but being
ble to comply with the conditions in the Loeb will, offered to give
their claim, and the Institution indicated its willingness to accept
responsibility, through the National Museum. The fund should
eafter yield an annual income of about $1,155, though the amount
the calendar year 1920 will be slightly less.

y means of this income from the Morris Loeb fund, the Smith-
ian Institution proposes to build up in the National Museum "the
b collection of chemical types," a permanent reference or study
ection of new substances and original material resulting from
mical research. Steps will be taken to secure a competent advisory
mittee composed of eminent chemists of the country to advise
he policy to be pursued in dealing with investigators desiring the
of portions of type material in the Loeb collection.

he general scheme has the sanction of various governmental
nists, and the Bureau of Chemistry, Department of Agriculture,
ring the establishment of such a collection under the Museum as
proper place for a national collection, offers hearty cooperation,
ing at the Museum's disposal in developing this project any of
bureau's resources in the way of personnel, equipment, and sup-
s.

is hoped shortly to reorganize the division, or section, of chem-
industries, in the department of arts and industries, begun in
3. Insufficiency of funds prevents this being done at once. In
meantime the Loeb collection, as well as other chemical specimens
ch the agitation of this subject will doubtless bring to the
seum, will be cared for under the direction of one of the curators
rts and industries.

BUILDINGS AND EQUIPMENT.

he first deficiency act for 1920 included an item of $5,640 for
ing the Natural History Building in the same condition as it
when occupied by the Bureau of War Risk Insurance in October,
7. This permitted the pointing up of the damaged plastered
ls and the painting of walls, ceilings, and floors in the area occu-
l by the bureau from October, 1917, to March, 1919.

Other improvements in this building from the regular Museum appropriation included repairs of settlement cracks in Venetian floors in exhibition halls, the pointing up of cracks and painting the walls and ceiling of these halls, painting walls and ceilings of comfort room and rooms 223 and 224 on third floor, painting floors in west north and west ranges, repointing open seams in the granite courses and ledges on exterior and court walls and the stone steps at south entrance, the painting of exterior surface of metal window frames of first and second stories, and painting gutters. The building in the east court was remodeled for use as a laboratory.

In the Arts and Industries Building the exterior woodwork of the windows was painted; a number of walls in the exhibition halls, offices, and laboratories were repainted, including the café; and an additional dark room was constructed in the photographic laboratory.

An improved system of ventilation was installed in the mascerating room in the south shed.

The deficiency act above referred to also provided the sum of $14,000 to enable the regents of the Smithsonian to heat and fit up for the exhibition of aircraft and accessories the temporary metal structure erected in the Smithsonian Grounds by the War Department with the understanding that the custody and control of the building be transferred to the regents of the Institution by the Secretary of War. Immediately after the building was turned over to the Institution in November, the old heating equipment was condemned and sold and arrangements made to heat and light the building from the power plant of the National Museum. Steam pipes were run from the Arts and Industries Building, and electric lights were provided for use on dark days and for police purposes at night.

To make the interior of the building suitable for exhibition purposes, a concrete floor was laid in place of the wooden floor, which had deteriorated to an extent that made its use impossible. The entire ceiling and side walls were sheathed, covered with wall board, and painted. Ventilators were installed at either end of the building, a concrete platform constructed at the east end of the building, and a glazed vestibule built at this end to be used as a public entrance. A combination storage, workroom and office was partitioned off in the southeast corner and a new comfort room constructed. The doors on the north side were closed, two doors on the west side remodeled as emergency exits, and the exterior of the building was painted.

The additions to the furniture this year included 30 exhibition cases and bases, 229 storage cases and pieces of laboratory and office furniture, 198 standard unit drawers, 602 insect drawers, and 388 special drawers.

The power plant was closed for two months and eight days, during which time electric current for light and power was purchased from the Potomac Electric Power Co. under special contract made by the Treasury Department.

The changes and repairs to the plant consisted of the installation of the forced oil-feed system for the engines purchased the previous year; the purchase and installation of asbestos covers for the four boiler drums, together with the repairing of the covering on the pipes and smoke breeching in the engine room, and the purchase and installation of a new pump for removing water of condensation from the main exhaust pipe. For the first time since the installation of the plant, in 1909, it became necessary to replace the tubes in two of the boilers and also to have the main bearings of two engines rebabbitted. Though the entire plant has been operated under pressure the deterioration is, in the opinion of the engineer, largely due to the inability of the Museum to secure competent and reliable men as stokers, firemen, and assistant engineers at the very small salaries paid.

MEETINGS AND CONGRESSES.

The annual meeting of the National Academy of Sciences was held again this year in the Museum, on April 26, 27, and 28, the auditorium and committee rooms being used, respectively, for the presentation of the scientific papers and the business sessions. On the first evening the William Ellery Hale lecture in the form of a discussion by Dr. Harlow Shapley, of Mount Wilson Solar Observatory, and Dr. Heber D. Curtis, of Lick Observatory, on the scale of the universe, was followed by a conversazione in the National Gallery of Art and the adjoining halls of the Museum.

Governmental, scientific, and educational organizations making use of the auditorium and the committee rooms included: The National Women's Trade Union League of America, for the First International Congress of Working Women; the Delaware River Shipbuilders' Council, for a conference of workers in various navy yards and shipyards of the United States in reference to the Government's shipbuilding and shipping program; the American Association of Anatomists, for its annual meeting; the American Association of Ichthyologists, for its annual meeting; Southern Sociological Congress; the American Association of Museums, for its fifteenth annual meeting; the United States Department of Agriculture, for a meeting of fertilizer manufacturers in connection with an investigation of fertilizer prices; the States Relations Service of that department, for various gatherings of its employees, including a seven-day conference of its farm-management demonstrators from all parts of the country and the annual meeting of the Potomac

Garden Club organized under its auspices; the Bureau of Plant Industry, for a phytopathological seminar; and the Federal Horticultural Board, for a public hearing to consider the advisability of quarantining the States of Texas and Louisiana on account of the pink bollworm of cotton; the War Department, for the closing exercises of the Army Medical School session 1919–20; for the fourth Hamilton fund lecture by the Rev. Dr. Charles E. Jefferson on "The old order and the new"; the National Research Council, for a lecture by Dr. John J. Carty on the wireless telephone, illustrated by talking motion pictures; the District of Columbia Minimum Wage Board, to bring together the women employed in hotels, restaurants, apartment houses, and hospitals of Washington, that they might select representatives to serve on the minimum-wage conference for this industry; the public schools of the District, for lantern-slide talks on trees, birds, and gardens by Mrs. Susan Sipe Alburtis before children of the public schools of south Washington; the Southern Society of Washington, for a lyceum on five Wednesday evenings during the winter and spring; the Anthropological Society of Washington, for its gatherings of the 1919–20 season; the Anthropological Society and the Washington Academy of Sciences, for a lecture by Dr. W. H. R. Rivers on ethnology, its aims and needs; the Washington Society of the Archæological Institute of America, for a lecture by Sir Bertram Windle on the megalithic monuments of Great Britain; for a special exhibition of motion pictures of national forests before delegates to the annual convention of the American Pharmaceutical Association; the Audubon Society of the District of Columbia, for its annual meeting, with lectures by Dr. Paul Bartsch on the birds of the District of Columbia, and again for an illustrated lecture by Dr. William L. Finley on wild game; the Wild Flower Preservation Society; the Consumers' League of the District of Columbia, for addresses by Hon. William B. Colver and Mrs. Florence Kelley on the cost of living from the consumer's standpoint; the committee in charge of "Be-kind-to-animals week," for an illustrated lecture by Mr. Ernest Harold Baines on the part played by animals in the war, and again for organizing a "Good-to-animals society"; the U. S. S. Jacob Jones Post No. 2 of the American Legion, to celebrate its first anniversary; the Association of Appointment Clerks; the Smithsonian Auxiliary of the District of Columbia Chapter of the American Red Cross; the Smithsonian Relief Association, for its annual meeting; for awarding the prizes for the Evening Star Army enlistment essays; the Washington Society of Engineers for a discussion of the preliminary report of the engineering council's committee on classification and compensation of Government engineers; and the Washington section of the American Society of Mechanical Engineers.

The work of the Congressional Joint Commission on Reclassifica-n of Salaries created great activity among the civil employees of e Government in Washington, and the Museum afforded a meeting ace for the scientific-technical section of the Federal Employees' nion No. 2, to complete the organization of the section, for a sym-sium on the principles involved in fixing salaries, and for ad-esses by Prof. Irving Fisher on the purchasing power of salaries d by Drs. McClung and Howe on the work of the National Re-arch Council; for the Smithsonian branch of the Federal Em-loyees' Union No. 2, and for various other groups of civil employees r organizing, preparing data, and otherwise helping toward the assification of the Government forces in Washington, including ederal workers interested in bookkeeping, accounting, and auditing, e clerical force of the Department of Agriculture, the Federal hotographers, the marine and stationary operating engineers, the bcommittee on personnel of the reclassification committee, and embers of the Museum's scientific staff.

MISCELLANEOUS.

Under the auspices of the Arts Club of Washington, a special ex-ibition of illustrations of the famous bell towers of the world was eld in rooms 46 and 47 of the Natural History Building from Oc-ober 2 to 31, inclusive. The Arts Club has undertaken to enlist the ooperation of all lovers of freedom in furthering a plan to erect at he Nation's Capital a national peace tower with the largest and finest arillon that the most expert bell founders of the world can provide, s a tribute to the heroic resistance of Belgium, in recollection of our ead and those of our allies, and in enduring commemoration of the reat victory won over imperialism.

An exhibition of drawings, photographs, and paintings illustrating e activities of the Air Service of the United States Army at the ont and in America was opened to the public from October 4 to ctober 29, 1919, in the west north range, ground floor, Natural His-ry Building. Capt. Otho Cushing was in charge of the exhibit.

The Museum library was increased by 1,932 bound volumes and 581 pamphlets, mainly obtained by gift and exchange, bringing the tal in the library up to 56,617 volumes and 88,690 pamphlets and nbound papers. While there were no exceptional pieces contributed, ere was a collection of special importance—the personal library of r. Charles D. Walcott. His intimate association with the paleon-logical collections of the Museum makes the Museum sectional braries of vertebrate and invertebrate paleontology difficult of dup-cation.

The publications of the Museum for the year consisted of the An-ual Report for 1919; volumes 54, 55, and 56 of the Proceedings;

volume 21 of Contributions from the National Herbarium, Bulletins Nos. 106 (text), 107, and 108, a very small edition of Bulletin No. 103, and 42 separate papers. The total distribution of Museum publications aggregated 81,936 copies.

The number of visitors to the Natural History Building aggregated 321,568 for week days and 101,416 for Sundays. At the Arts and Industries Building, which is open only during the week, the total attendance was 250,982. The Smithsonian Building is ordinarily only open to visitors on week days, but an exception was made for a few Sundays in March and April, 1920, when there was on exhibition a series of exquisite water color paintings by Mrs. C. D. Walcott of wild flowers, the attendance being 84,223 on week days and 1,790 on the five Sundays.

The most pressing needs of the Museum are those for additional space for the ever-increasing collections and additional funds for their classification and maintenance. Another year has only made more acute these needs. Preliminary steps are being taken looking to securing the erection of another building to house the great historical collections of the Museum and the collections of the National Gallery of Art. It will nevertheless be some years before relief can be hoped for in this direction, even under the most favorable circumstances. The appropriations for the maintenance of the Museum for 1921 remain practically the same as those for 1920. Never were there so many openings for advancement in industrial as well as scientific lines, but under existing conditions the Museum is helpless. It is not only prevented from developing collections in the various directions now offering exceptional opportunities, but it carries forward existing work only by exercising the strictest economy.

Respectfully submitted.

W. DEC. RAVENEL,
Administrative Assistant to the Secretary,
In charge United States National Museum.

Dr. CHARLES D. WALCOTT,
Secretary, Smithsonian Institution.

APPENDIX 2.

PORT ON THE BUREAU OF AMERICAN ETHNOLOGY.

SIR: In response to your request I have the honor to submit the folving report on the field researches, office work, and other operations the Bureau of American Ethnology during the fiscal year ended ne 30, 1920, conducted in accordance with the act of Congress apoved July 19, 1919. The act referred to contains the following m:

> merican ethnology: For continuing ethnological researches among the Ameri Indians and the natives of Hawaii, including the excavation and preservation archeologic remains, under the direction of the Smithsonian Institution, inding necessary employees and the purchase of necessary books and periodis, $42,000.

Ethnology is the study of man in groups or races and aims to conbute to our knowledge of racial culture and advance our appretion of racial accomplishment. The researches of the Bureau of nerican Ethnology deal with the aborigines of the United States d the Hawaiian Islanders.

The material from which we may secure this knowledge is rapidly sappearing or being absorbed into modern life. The culture of the original inhabitants has in a great measure vanished, but modern rvivals still remain, and it is one object of the bureau to record these rvivals while this is possible, thus rescuing what remains as a rtial record of the culture of the race. This is essential in order at our knowledge of the North American Indian may neither be storted by prejudice nor exalted by enthusiastic glorification.

In linguistics the necessity of recording those languages that are danger of extinction is urgent. Several of these are now spoken y by a few survivors—old men or women—and when they die s knowledge which they possess will disappear forever. Our lians had a large literature and mythology which on account of ir ignorance of letters they did not record. This is rapidly being t, and it is our duty to secure the information at once before it es its aboriginal character. The lexical and grammatical structure the different Indian languages, their phonetic peculiarities, and ir relations to each other, also require intensive studies, which ve been industriously pursued by the linguists of the bureau.

It is believed that the publications of the Bureau of American Ethnology should be of such a nature that they may be studied with profit by all intelligent persons and not so crowded with technicalities as to repel all readers except a few specialists. While the bureau publications should not be devoted solely to popular articles they fail to advance and diffuse ethnological knowledge if they are so technical that they appeal only to one class of readers. The policy of the bureau is to publish a limited number of technical papers, the popular demand also being given due weight.

Important researches have been conducted by members of the staff on the material culture of the Indians, one aim being to ascertain the various fibers and foods used by them with a view to discover hitherto unused aboriginal resources that might be adopted with profit by the white man.

In order that the character of the habitations of the Indian might be better known and an accurate knowledge of them disseminated, illustrations of aboriginal buildings found in early maps and documentary records are being gathered and a series of publications on this subject has been inaugurated. These, when available, are accompanied by the original descriptions of the buildings and incidentally identifications of the sites of the larger villages so far as possible.

The bureau has continued researches on the music of the Indians with good results, as the past publications on this subject have attracted the attention of musicians who are making practical use of this knowledge in their compositions. There is a great demand for strictly Indian music.

Archeology has been one of the important lines of research by members of the bureau during the past year. Although the methods of research of this science are somewhat different from those of the ethnologist, the goal is the same.

It is urgent to gather all possible data regarding the ethnology of the Indian prior to the advent of the white man, and where written history is silent on this subject, legends, monuments, and other prehistoric remains are the only media to supply the unknown chapters of history. As the national parks, like the Mesa Verde, and national monuments, like the Chaco Canyon, containing the best examples of this evidence, have been reserved for permanent protection, the bureau is engaged in the scientific study of these remains in cooperation with the National Park Service.

The function of the Bureau of American Ethnology is both to advance knowledge of ethnology and archeology by researches and to disseminate information on all subjects concerning Indians. Much of the time of the chief and the members of the staff is occupied in replying to letters requesting this information. This in many cases requires special knowledge of experts or extended studies in the library. The administration and routine duties of the office have also occupied much of the time of the chief.

The Great War has enlarged our view of the practical value of ethnological studies. As our country has become a world power and has entered into political and commercial relationships with many other races whose ethnology is little known, it is desirable that the ethnological researches of the bureau be enlarged in order that we may better appreciate these foreign peoples. From necessity we have limited our researches to the American Indian and the natives of Hawaii. There is, however, an urgent call for more extended studies of all peoples whose amalgamation will constitute the future American.

In addition to purely official duties, the chief has devoted considerable time to field work and the preparation of reports on archeological researches. In the course of the year two visits were made to the Mesa Verde National Park, Colorado—one in August and September, 1919; the other in June, 1920. These researches, in accordance with the above-mentioned act of Congress for the excavation and repair of archeological remains, were in continuation of the cooperative work of the Smithsonian Institution and the National Park Service of the Department of the Interior, and were made with an allotment from the latter for the excavation and repair of cliff houses and other ruins on the Mesa Verde.

In the summer and autumn of 1919 the chief excavated and repaired Square Tower House, formerly known as Peabody House, one of the most picturesque cliff dwellings of the park. The excavation of small house sites situated among the cedars on top of the mesa near the trail to Square Tower House was carried on simultaneously by Mr. Ralph Linton, under the direction of the chief.

The work at Square Tower House has enlarged our knowledge of the structure of cliff dwellings; that on small house sites contributes to theoretical discussions of their genesis and evolution. The small house sites on top of the mesa were interpreted as prototypes of kivas in the large cliff buildings and are thought to be the ancient stages in their development. The whole history of the evolution of horizontal masonry can be followed by studies of various types of buildings on the Mesa Verde.

The two unique characteristics of Square Tower House are a square tower situated in the middle of the ruin and the well-preserved roofs with beams intact on two of the ceremonial rooms, or kivas. The repair of the tower was timely, as it had been feared for many years that it would fall, since it has long been tottering. As all friends of our antiquities would regard the destruction of this as a calamity, it was strengthened and put in a condition for permanent preservation.

The roofs of two of the eight kivas in Square Tower House were almost intact and show the best specimens of aboriginal carpentering in the park. Almost all of the original beams are still preserved, and their arrangement shows how the aboriginal builders constructed a vaulted roof. Especial care was exercised in repairing Square Tower House to protect these roofs and preserve the beams in place for examination by archeologists and visitors.

Small house sites are very numerous on top of Mesa Verde among the dense growth of cedars, and two of these situated above Square Tower House were chosen as types of the remainder for excavation. The rooms uncovered on these sites may be called Earth Lodges, and had sunken floors with roofs now fallen in but originally constructed of logs covered with earth. One of these rooms, called Earth Lodge A, was completely excavated, and in order that the style of the most ancient habitation on the park might be seen by visitors it was protected from the elements by a shed. Another form of Earth Lodge, subterranean and probably of later construction, had stone pilasters like a cliff-house kiva for the support of a domed roof, but its walls were made of adobe plastered in the earth. It shows three periods of occupancy: (1) the original excavation, a subterranean room constructed on the lines of the unit type of kiva; (2) its secondary use as a grinding pit, by the introduction of vertical slabs of stone making three grinding mills, the metates of which were in place; and (3) a depression filled in with débris containing human skeletons and other bones. It may thus have served distinct purposes at different times.

The theoretical importance of Earth Lodge A is that it represents not only the archaic type of building on the mesa but also resembles those widely distributed habitations of nonpueblo tribes. It points to the conclusion that when the ancient colonists came to the Mesa Verde they differed only slightly from nomadic tribes and that their descendants developed the craft of stonemasons long after Earth Lodge A was inhabited.

Archeological work was renewed on the Mesa Verde in June, 1920, and the work of excavating was begun on a ruin called Painted House and a neighboring cliff dwelling. The result of this work was of great significance, for it brought to light a large cliff building that showed no evidence of having been formerly inhabited. It was not a cliff dwelling, but built for some other purpose. Its character points to the conclusion that this purpose was a temple for the celebration of fire rites, or possibly the conservation of that fire from year to year. While there was found no evidence that anyone ever ed in it, an adjacent cliff dwelling afforded every indication that was inhabited by at least two clans. New Fire House belongs to same group of ceremonial buildings as Sun Temple, except that is situated in a cliff and not on top of the mesa.

The features that have led to the identification of this ruin as one voted to New Fire rites are the large walled fire pit full of ashes in middle of the court and the resemblances of phallic and other tures on the walls of the rooms to those still surviving among the pi in the New Fire cult.

Mr. James Mooney, ethnologist, remained in the office throughout year, engaged chiefly in the elaboration of material relating to the raldry of the Kiowa and the Peyote Cult of the Southern Plains bes.

In connection with the preparation of the Denig Assiniboin manu- ipt for publication, a correspondence was carried on with members the Denig family and others for the purpose of gathering all avail- le information concerning the history and personality of the author. valuable complement to the Denig work is the German manuscript rnal of the Swiss artist, Friedrich Kurz, who visited the upper issouri in 1851–52, spending some months with Denig at Fort Union. copy of the original journal, now in the museum of Bern, was de some years ago by direction of Mr. David I. Bushnell, jr., who ld it to the bureau.

The usual amount of correspondence in answer to requests for va- d ethnologic information received attention. Among these may be ted requests from the War Department for Indian designs for regi- ntal flags for two newly organized regiments.

In the latter part of October and throughout November, 1919, Dr. hn R. Swanton, ethnologist, was at Anadarko, Okla., where recorded about 270 pages of text in the Wichita language and 0 in Kichai, besides considerable vocabulary material in both. should be remarked that the Kichai language is rapidly becoming tinct, being now spoken fluently by not over a dozen persons.

During the summer preceding this expedition he was engaged in the traction and card-cataloguing of words from his Natchez texts, d after his return he prepared a grammatical sketch of the Natchez nguage, complete as far as the material on hand will permit, but ithheld from publication for a final review with the help of Indian formants. This language is now spoken by only three persons.

He also completed a sketch of the Chitimacha language, the rough aft of which had already been prepared, and began the extraction d recording of words from his texts in the Koasati language.

Part of his time has been occupied in correcting the proofs of his lletin 73, on the Early History of the Creek Indians and Their ighbors.

Several hundred cards have been added to his catalogue of material bearing on the economic basis of American Indian life.

Dr. Swanton completed reading the proofs of Bulletin 68, A Structural and Lexical Comparison of the Tunica, Chitimacha, and Atakapa Languages, and the bulletin was issued in December, 1919.

The sketch of the Chitimacha language mentioned above, along with a similar sketch of Atakapa previously prepared, is ready for publication. Dr. Swanton has a much longer paper on the social organization and social customs of the southeastern Indians which requires a little work for completion, but is withheld until the bulletin, which it naturally follows, is through the press.

Mr. J. N. B. Hewitt, ethnologist, took up the critical analysis and constructive rearrangement of the three differing versions of the Eulogy of the Founders of the League of the Iroquois, obtained by him, respectively, from the late Seneca federal chief, John Arthur Gibson; the late Mr. Joshua Buck, Onondaga shaman, of Onondaga-Tutelo extraction; and chief emeritus Abram Charles, of the Cayuga tribe—all of Ontario, Canada.

This Eulogy of the Founders is a very long chant and one of marked difficulty to render accurately. In his report for last year it was stated that the long-standing disruption of the several tribes composing the league had led to the breaking up of the parts thereof and loss of traditions concerning the principles and structure of the league; hence there are differing versions of most important rituals. In the tribal organization the federal chiefs were organized into several groups with definite political relationships, which differing relationships implied naturally corresponding differences in duties and obligations for the several persons so politically related.

But since the disruption of the political integrity of the tribes of the league and of the league itself by the events of the war of the American Revolution these relationships have become more or less confused in the minds of the people, and hence the great difficulty in determining from the informants of to-day the correct sequence of the names and the exact political relationships subsisting among the several chiefships. This accounts for the difficulties encountered in editing the three variant versions of the eulogy.

In view of works recently published on the genetic relationship of certain linguistic stocks of California and other North American linguistic stocks, and as a result of a conference of the staff of the bureau early in December on late linguistic work in California Mr. Hewitt critically examined the methods and the evidences for relationship relating to the Yuman, the Serian, the Tequistlatecan, Waicuran, the Shahaptian, the Lutuamian, and the Waiilatpuan, laimed in recent publications by Dr. Radin and Dr. Kroeber. In o instance did he find that these authors had proved their case.

Mr. Hewitt continued the preparation for publication of the second art of Iroquoian Cosmology, Part I having already appeared in the wenty-first Annual Report of the bureau. He spent considerable ime in reading the manuscript dictionary and grammatical sketch of he Chippewa language prepared by Father Chrysostom Verwyst, in rder to ascertain its value for publication and to enable him to assist he author in a revision of the work; and prepared much data for use n reply to requests by correspondents, often requiring considerable ime and most exacting work.

In June, 1920, Mr. Hewitt visited the Oneida Indians, residing in he vicinity of Seymour and Oneida, Wis.

The purpose of this visit was to ascertain what information, if any, hese Indians retained concerning the principles and structure of the eague of the Five (later, Six) Nations, or even concerning their own ocial organization, or the mythic and religious beliefs of their an-estors, which has not already been recorded by him, from other ources. He found that these Indians had forgotten the great prin-iples and the essential details of the organic structure of the league, f which the Oneida before their disruption by the events of the war f the American Revolution were so important a member, due to the doption of lands in severalty about 1887, and the administration of heir public affairs under the laws of the State of Wisconsin.

He discovered that these Oneida spoke a dialect markedly different from that of the Oneida with whom he was already acquainted and succeeded in recording a text relating to hunting wild pigeons (now practically extinct) at the time of "roosting."

From the Wisconsin Oneida Mr. Hewitt went directly to the Tonawanda Reservation to consult with Seneca chiefs, after which he proceeded to the Grand River grant of the Six Nations, near Brantford, Ontario, Canada, and there obtained an interesting text in the Onondaga language, with a free English translation. This text embodies an old Tutelo tradition of the manner in which the assistant to the chief was established, and is reminiscent of the early raids of the warriors of the Five Nations into the southern home of the ancient Tutelo.

Information relating to the internal structure of the tribal organization of the several tribes was carefully revised, especially the place of the several clans with regard to the symbolic council fire, and therefore their membership in either the male or the female side of the tribal organization. Certain sentences placed after every Federal title throughout the Eulogy of the Founders—originally 49 in number—can not be understood without this definite knowledge of internal tribal organization, as there is constant danger of confusing tribal with Federal relationships. The internal tribal organization differed among the Five Nations and the knowledge of one or two is not sufficient.

With the aid of Mr. Asa R. Hill as Mohawk interpreter and informant, the work of the textual criticism of the Mohawk text of the league material originally collected by Mr. Seth Newhouse, a Mohawk ex-federal chief, was revised. Knowing that Mr. Newhouse is a fine Mohawk speaker, Mr. Hewitt induced him to translate his material back into the language from which he had rendered it into indifferent English. This translation was not desired for publication but to obtain the correct Mohawk terminology or diction for the expression of the ideas embodied in the material.

During the year Mr. Francis La Flesche, ethnologist, devoted most of his time to the task of preparing for publication the manuscript of the first volume of his work on the Osage Tribe. In February the text of the first volume was finished and the manuscript placed in the hands of the Chief of the Bureau of American Ethnology.

The volume contains two elaborate ancient rituals, the first of which is entitled "Ga-hi′-ge O-k′o^{n}, Ritual of the Chiefs"; and the second "Ni′-ki No^{n}-k′o^{n}, Hearing of the Sayings of the Ancient Men." These rituals are rendered in three forms: First, in a free English translation; second, the recited parts, also the words of the songs, as given by the Indians themselves in their own language into the dictaphone; third, a translation from the Osage language into English as nearly literal as can be made. Owing to the peculiar modes of expression used in the rituals by the Indians, such as metaphors, figures of speech, tropes, and archaic terms, it is impossible to give an absolutely literal translation. Furthermore, much of the language used in these rituals is in ceremonial style and not that in daily use among the people.

On the completion of the manuscript of the first volume, Mr. La Flesche took up the task of preparing for publication the manuscript of the second volume.

Mr. J. P. Harrington, ethnologist, spent the months of July, August, and September, 1919, on field duty in New Mexico in pursuance of his studies of the ethnology and linguistic relationship of the Southwest Indians. These studies resulted in a large amount of most carefully heard textual, grammatical, and lexical material from the Tano-Kiowan family of languages, the elaboration of more than 750 pages of which was completed for publication before the close of the fiscal year.

Important discoveries in connection with this work are that Zuñian is definitely added to the Tano-Kiowan-Keresan-Shoshonean stock; and that the religious-ceremonial words of Tanoan are largely borrowed from Zuñian and Keresan. This last discovery has proved one f the most interesting features of the work, for, just as it can be ıown that the watermelon and muskmelon, for example, are not ative to the Tanoan Indians because designated by Spanish loan-'ords or by mere descriptive terms, so it can be also demonstrated nguistically that the Tanoans have adopted many features of the uñian and Keresan religion. Even such fundamental conceptions s Wenima, the abode of the dead, and Sipapu, the entrance to the ther world, have been taken over by the Tanoans, e. g., as Tewa 'ayima and Sip'o phe.

At the close of September Mr. Harrington returned to Washing-)n and was engaged during the remainder of the year in the elabo-ıtion of his material. Mr. Harrington also performed various ffice duties during this period.

In August, 1919, Dr. Truman Michelson, ethnologist, renewed his searches among the Fox Indians, which consisted exclusively of orking out a grammatical analysis of the Indian text of his manu-ript on the White Buffalo Dance, in order to make a vocabulary)r the same. He returned to Washington near the middle of Sep-mber, when he resumed his work on the Indian text, as well as the)cabulary. The manuscript was submitted in March, 1920.

During the winter Dr. Michelson worked on the manuscript of the 'hite Buffalo Dance; he also spent some time on a rough transla-on of an autobiography of a Fox Indian woman written in the cur-nt syllabary. This translation was based on a paraphrase in Eng-sh written by Horace Poweshiek. In the middle of June he left ır Tama, Iowa, to restore the syllabary text phonetically, to further ork out a grammatical analysis to enable him to add a suitable)cabulary, to elucidate a number of ethnological points, and to cor-ct the translation in a number of places. By the close of the fiscal ear he entirely restored the text phonetically.

In addition, Dr. Michelson has furnished data for official corre-)ondence.

SPECIAL RESEARCHES.

In addition to the work of members of the staff mentioned in their ports above, the bureau has employed others in ethnological and rcheological researches.

Mr. Neil M. Judd, curator of American archeology in the United tates National Museum, was detailed in June to complete a report n his work for the bureau in previous seasons in southeastern Utah. t the time of writing no report on this work has been received.

Miss Densmore resumed work on the Pawnee songs on September , 1919. Transcriptions and analyses of 58 Pawnee songs have been ıbmitted during the year. These comprise songs of the Morning tar ceremony and of the Buffalo dance, the Bear dance, and the

Lance dance. In April, 1920, she visited the Pawnees a second time and was permitted to enter the lodge during the Morning Star ceremony and to see the contents of the "sacred bundle." This bundle is opened once a year. (It is said that only one other white person has been permitted to enter the ceremonial lodge.) This ceremony afforded an opportunity to hear certain interesting rituals which are sung only at this time.

Three manuscripts on Pawnee music have been submitted during the year. In addition to the ceremonial material above mentioned these papers contain songs of war and of a game, as well as miscellaneous songs and those connected with folk tales. The Pawnees were selected as representative of the Caddoan stock, according to the plan of comparing the songs of the various linguistic stocks.

About the middle of February, 1920, Miss Densmore began a study of the Papago Indians as a representative of the Piman stock. For more than a month she lived at San Xavier Mission, a Government station, among the Papago near Tucson, Arizona, and recorded more than 100 songs, 25 of which have been transcribed, analyzed, and submitted. Three subjects were studied—treatment of the sick, customs of war, and ancient stories. As examples of the psychology revealed by musical investigation it may be noted that the Papago state that all sickness has its origin in the anger of a mythical "creator," and that many of the songs used in treating the sick are said to have been received from spirits of the dead.

Miss Densmore considers the chief points of the year's investigation to be the evident contrast of songs of different linguistic stocks and the increasing evidence that rhythm in Indian song is more varied and important than melody. It is interesting to note that the songs recorded by an individual Indian doctor showed similarity in melodic material and formation, but a wide variety in rhythm. The poetry of the words of Papago songs is of an unusually high order.

In April, 1920, Miss Densmore visited the "Mohave" Apaches living at Camp MacDowell near Phoenix, Ariz., with a view to recording songs among them next season, taking the Apache as the representatives of the Athapascan stock.

In July, 1919, Miss Densmore visited the Manitou Rapids Reserve in Canada to obtain data on the customs of the Canadian Chippewas for comparison with the tribe in the States. She found an interesting contrast in bead patterns and collected considerable information on their general culture. August 14 to 30, 1919, she worked on the botanical section of the book on Chippewa Arts and Customs, this section comprising the use of plants as food, medicine, and charms.

r. David I. Bushnell, jr., continued the preparation of his manu- ot for the Handbook of Aboriginal Remains East of the Rocky ntains, and in the course of his work has prepared a bulletin tled "Native Villages and Village Sites East of the Mississippi," ch has been published as Bulletin 69. He has also written Bulle- 71, on "Native Cemeteries and Forms of Burial East of the Mis- ppi," the final proofs of which have been sent to the printer, but work has not yet been delivered to the bureau. The favorable ption of these bulletins, as indicated by the many applications le at the office for them, is gratifying.

r. Bushnell also gathered notes, maps, and photographs to be l in the preparation of two manuscripts for the bureau. One have the title, "Villages of the Algonquian, Siouan, and Cad- n Tribes West of the Mississippi"; the second, "Burials of the onquian, Siouan, and Caddoan Tribes West of the Mississippi." former is nearing completion, and both should be finished dur- the next fiscal year.

he results of the archeological work in Texas under Prof. J. E. rce, for which a special allotment was made, are important. nnoissance work has been done in the eastern, middle, and west- parts of the State. Indian mounds at Athens, in eastern Texas, yielded pottery akin in form and technique to that of the Mis- ppi, suggesting cultural connections which have as yet not been pletely traced. In western Texas the group of pictographs at nt Rock has been given especial attention. They are little known, ney are at present seldom visited by tourists. This series of rock ures is important enough to be protected by law. The present er of the ranch upon which they are situated, recognizing their ortance, will prevent vandalism.

he work was mainly on the antiquities of central Texas, where nsive work was much to be desired. Prof. Pearce, who has ge of this work, believes that the mounds in this part of the e are kitchen middens and that they were connected with the men who came into this region. He is also of the opinion that culture which they represent was much cruder than that of the rical Indians; that they knew nothing of polishing stone or of ery making; and that for thousands of years they were the only pants of the open prairies and plains of central and west Texas; finally, that their life was little modified during the entire period e formation of the mounds. Prof. Pearce's report is so promis- of results that work in Texas will be continued another year.

though the aboriginal monuments called mounds and stone es of the Cumberland Valley have been investigated by several known archeologists, it appears from the researches of Mr.

W. E. Myer, of Nashville, that much remains to be discovered in this region. Under his guidance the chief visited the aboriginal mounds on the Harpeth River at Oldtown, Castalian Springs, and elsewhere. It was seen that while many of the smaller mounds have been plowed down by cultivation of the land the larger ones still bear mute evidence of the industry of the builders of these structures and the magnitude of the population.

Mr. Myer has transmitted to the bureau a manuscript on the antiquities of the Cumberland Valley, Tenn., the results of a lifelong devotion to the subject.

Mr. Otto Mallery has presented to the bureau a valuable pueblo collection from the Chama region, New Mexico, made by Mr. J. A. Jeancon, who had charge of the work, and has transmitted a report which is now being prepared for publication.

Mr. Gerard Fowke was given a small allotment for an archeological reconnoissance of the Hawaiian Islands. He began work in May and reports important results which it is too early to detail at this time.

MANUSCRIPTS.

The following manuscripts, exclusive of those submitted for publication by members of the staff of the bureau and its collaborators, were purchased:

"Wawehock Texts," by Frank S. Speck.

"History of the Jesuit Mission in Paraguay." The original manuscript, being an English translation by Dr. George Spence, from the original French manuscript of the Abbé Jo. Pedro Gay, Curé de Uruguayana. 2 vols., 4to. Circa 1880. 275 pp.

"A New Guarani Grammar," the original manuscript complete, being a translation into English by Dr. George Spence from the French manuscript of l'Abbé Jo. Pedro Gay, Curé de Uruguayana. 2 vols., 4to.

"Manuel de Conversation en Français, en Portugues, en Español, en Guarany Abañeeme par le Chanoine J. P. Gay, curé de Uruguayana," arranged in four columns.

"Nouvelle Grammaire de la Langue Guarany et Tupy, etc., par le Chanoine J. P. Gay, Curé, etc., 188 p., folio.

"Mappa geographico da republica do Paraguay pelo conego Joao Pedro Gay, pelo engenhiero Falix Alx. Grivot. 1881.

A copy of "Manuel de Conversation en Français, en Portugues, en Anglaise, en Español, en Guarany Abañeeme." Arranged in five columns. No date.

In addition to those purchased Mr. Edward M. Brigham has submitted for publication a valuable manuscript with many plates on "The Antiquities of the Marajo," Brazil; and Mr. W. E. Myer, of

Nashville, Tenn., a manuscript on "The Antiquities of the Cumberland Valley of Tennessee." "A Chippewa Bible History in manuscript in four volumes. 8vo. A. D. 1896–1901," was presented by Fr. Chrysostom Verwyst, O. F. M.

EDITORIAL WORK AND PUBLICATIONS.

The editing of the publications of the bureau was continued through the year by Mr. Stanley Searles, editor, assisted by Mrs. Frances S. Nichols. The status of the publications is presented in the following summary:

PUBLICATIONS ISSUED.

Thirty-third Annual Report.—Accompanying papers: (1) Uses of Plants by the Indians of the Missouri River Region (Gilmore); (2) Preliminary Account of the Antiquities of the Region between the Mancos and La Plata Rivers in southwestern Colorado (Morris); (3) Designs on Prehistoric Hopi Pottery (Fewkes); (4) The Hawaiian Romance of Laie-i-ka-wai (Beckwith). 677 pp. 95 pls.

Three separates from the Thirty-third Annual Report.

Bulletin 60.—Handbook of Aboriginal American Antiquities (Holmes). 380 pp.

Bulletin 68.—Structural and Lexical Comparison of the Tunica, Chitimacha, and Atakapa Languages (Swanton). 56 pp.

Bulletin 69.—Native Villages and Village Sites East of the Mississippi (Bushnell). 111 pp. 17 pl.

Bulletin 70.—Prehistoric Villages, Castles, and Towers (Fewkes). 79 pp. 33 pl.

PUBLICATIONS IN PRESS OR IN PREPARATION.

Thirty-fourth Annual Report.—Accompanying paper: Prehistoric Island Culture Areas of America (Fewkes).

Thirty-fifth Annual Report.—Accompanying paper: Ethnology of the Kwakiutl (Boas).

Thirty-sixth Annual Report.—Accompanying paper: The Osage Tribe (La Flesche).

Thirty-seventh Annual Report.—Accompanying paper: The Winnebago Tribe (Radin).

Thirty-eighth Annual Report.—An Introductory Study of the Arts, Crafts, and Customs of the Guiana Indians (Roth).

Bulletin 67.—Alsea Texts and Myths (Frachtenberg).

Bulletin 71.—Native Cemeteries and Forms of Burial East of the Mississippi (Bushnell).

Bulletin 72.—The Owl Sacred Pack of the Fox Indians (Michelson).

Bulletin 73.—Early History of the Creek Indians and their Neighbors (Swanton).

Bulletin 74.—Excavations at Santiago, Ahuitzotla, D. F., Mexico (Tozzer).

Bulletin —.—Archeological Investigations in the Ozark Region of Central Missouri (Fowke).

Bulletin —.—Northern Ute Music (Densmore).

Bulletin —.—Mandan and Hidatsa Music (Densmore).

Bulletin —.—Handbook of the Indians of California (Kroeber).

DISTRIBUTION OF PUBLICATIONS.

The distribution of publications has been continued under the immediate charge of Miss Helen Munroe, assisted by Miss Emma B. Powers. Publications were distributed as follows:

Annual reports and separates	3,373
Bulletins and separates	12,886
Contributions to North American ethnology	32
Miscellaneous publications	572
Total	16,863

As compared with the fiscal year 1919, there was an increase of 5,380 publications distributed. Fourteen addresses have been added to the mailing list during the year and 28 dropped, making a net decrease of 14.

ILLUSTRATIONS.

Mr. De Lancey Gill, with the assistance of Mr. Albert E. Sweeney, continued the preparation of the illustrations of the bureau. A summary of this work follows:

Photographic prints for distribution and office use	500
Negatives of ethnologic and archeologic subjects	300
Negative films developed from field exposures	100
Photostat prints made from books and manuscript	250

ILLUSTRATIONS PREPARED AND SUBMITTED FOR PUBLICATION.

Photographs retouched and otherwise	350
Line and color drawings	215
Illustration proof edited	1,400
Lithographic proofs examined at Government Printing Office	5,200

LIBRARY.

The reference library continued in the immediate care of Miss Ella Leary, librarian, assisted by Mr. Charles B. Newman.

During the year 820 books were accessioned, of which 140 were acquired by purchase and 680 by gift and exchange. Volumes made by binding serials are included in these figures. The periodicals currently received number about 800, of which 35 were obtained by purchase, the remainder being received through exchange. The library has also received 260 pamphlets. The catalogue of the bureau now records 23,380 volumes; there are about 14,508 pamphlets and several thousand unbound periodicals.

Successful effort has been made to complete the sets of certain publications of scientific societies and other learned institutions. For the use of the members of the staff there has been prepared and posted copies of a monthly bulletin of the principal accessions of the library;

lso information has been furnished and bibliographic notes compiled or the use of correspondents.

During the year the work of cataloguing has been carried on as new ccessions were acquired and good progress was made in cataloguing thnologic and related articles in the earlier serials.

Attention has been given to the preparation of volumes for binding, with the result that 502 books were sent to the bindery. The number f books borrowed from the Library of Congress for the use of the taff of the bureau in prosecuting their researches was about 400.

A pressing problem is the congestion of books on the shelves. For ome time the library has been overcrowded and we are now taxed to nd room for the current accessions.

The library is constantly referred to by students not connected with he bureau, as well as by various officials of the Government service.

COLLECTIONS.

The following collections acquired by members of the staff of the ureau, or by those detailed in connection with its researches, have een transferred to the United States National Museum:

Archeological objects collected in Cottonwood Canyon, Kane County, Utah, by Mr. Neil M. Judd, during the spring of 1919. Accession 63841, 257 specimens.

Archeological objects (748) and skeletal remains (24) collected for he bureau by Mr. Gerard Fowke, from Miller's Cave, Missouri, durng the spring of 1919. Accession 64150, 772 specimens.

Archeological collection, including human bones, from Sell's and Bell's Caves, Pulaski County, Missouri, forwarded by Mr. Gerard Fowke. Accession 64198, 83 specimens.

Archeological material from Texas, gathered from the surface by Dr. J. W. Fewkes and Prof. J. E. Pearce, in the autumn of 1919. Accession 64248, 165 specimens.

Sculptured stones of Huastec culture, presented to the bureau by Mr. John M. Muir, of Tampico, Mexico. Accession 64249, 5 specimens.

Three fine hardwood bows and three ceremonial clubs from British Guiana, and a blanket of the Cowichan Indians (Salish), Northwest Coast. Accession 64327, 7 specimens.

Collection of archeological objects (262) and skeletal material (16 pecimens), together with ethnologica of the Apache Indians (4 specimens), obtained in Arizona by Dr. Walter Hough during the spring of 1919. Accession 64603, 282 specimens.

Collection of archeological objects (212) and two human skulls, gathered by Dr. J. Walter Fewkes, at Square Tower House and coniguous ruins on the Mesa Verde National Park, Colo., in cooperation with the National Park Service of the Interior Department in 1919. Accession 64646, 214 specimens.

Archeological objects (446) and skeletal material (5) collected by Mr. J. A. Jeancon in an ancient ruin near Abiquiu, N. Mex., for Mr. Otto T. Mallery during the summer of 1919, and presented to the Bureau by Mr. Mallery. Accession 64885, 451 specimens.

PROPERTY.

Furniture and office equipment was purchased to the amount of $162.73.

MISCELLANEOUS.

Personnel.—The position of Honorary Philologist, held for several years by Dr. Franz Boas, has been abolished.

Clerical.—The correspondence and other clerical work of the office has been conducted by Miss May S. Clark, clerk to the chief. Mrs. Frances S. Nichols assisted the editor.

There has been no change in the scientific or clerical force.

Respectfully submitted.

J. Walter Fewkes,
Chief, Bureau of American Ethnology.

Dr. Charles D. Walcott,
Secretary, Smithsonian Institution.

APPENDIX 3.

REPORT ON THE INTERNATIONAL EXCHANGES.

Sir: I have the honor to submit the following report on the operans of the International Exchange Service during the fiscal year ding June 30, 1920:

The congressional appropriation for the support of the service ring the year was $45,000, an increase of $10,000 over the amount the regular appropriation for 1919. This increase was made essary in order to meet the cost of transportation at the prevailg high ocean freight rates on shipments of accumulated publicans for certain countries. The usual allotment of $200 for printing d binding was allowed by Congress. The repayments from dertmental and other establishments aggregated $4,992.96, making total available resources for carrying on the system of exchanges ring the fiscal year 1920 $50,192.96.

During the year 1920 the total number of packages handled was 9,372—an increase over the number for the preceding year of ,512. These packages weighed a total of 496,378 pounds—a gain 204,460 pounds. These increases in the number and weight of ckages handled are accounted for by the fact that during the year ipments were resumed to several countries with which exchange lations were suspended during the war, concerning which a statent will be made later in this report. It is gratifying to state that e work of the office during the past year exceeded by 27,705 packages e number handled during the fiscal year 1914, just prior to the outeak of the World War.

The number and weight of the packages of different classes are licated in the following table:

	Packages.		Weight.	
	Sent.	Received.	Sent.	Received.
			Pounds.	*Pounds.*
ed States parliamentary documents sent abroad	165,291	....	90,725	....
lications received in return for parliamentary documents	....	2,598	....	11,431
ed States departmental documents sent abroad	123,345	....	206,029	....
lications received in return for departmental documents	....	3,870	....	9,116
ellaneous scientific and literary publications sent abroad	56,484	....	125,137	....
ellaneous scientific and literary publications received from road for distribution in the United States	....	17,784	....	53,940
Total	345,120	24,252	421,891	74,487
Grand total	369,372		496,378	

Packages from foreign countries frequently contain more than one publication. The returns from abroad, therefore, are larger than would be supposed from a casual glance at the figures in the table. Even allowing for this, there is still a disparity between the number of publications sent and those received through the International Exchange Service. This apparent one-sidedness, however, is largely offset by the number of publications received by governmental and other establishments in this country directly through the mails from abroad. Several years ago (1907) the Institution brought this subject to the attention of the various bureaus of the Government and offered to make a special effort to secure for them more adequate returns for the publications sent by them through the Exchange Service to foreign correspondents. While several offices took advantage of this offer, and a large number of foreign publications were received for them by the Institution, many of the bureaus stated that the quantity and value of the publications received, either through the International Exchange Service or direct by mail, were considered an equivalent for the documents sent abroad. Quotations from some of the letters are given below:

Coast and Geodetic Survey.—Not all of our publications forwarded to foreign addresses are sent in anticipation of exchanges to be received by this bureau. Many are sent to individuals from whom no return is expected. I take it that in like manner many individuals, citizens of the United States, are favored with publications of interest to them put out by foreign Governments. I think we are now receiving all of the publications of other Governments in which we are interested. Many of these reach us through the mails.

Weather Bureau.—It is believed that the bureau already receives adequate returns from its foreign correspondents, most of whom send their publications by mail direct.

Office of the Chief of Staff.—Many of the exchanges are received by the War Department from our military attachés abroad, all of whom have pouch service through the Department of State, which probably accounts largely, if not entirely, for the lesser number of packages received than sent.

Nautical Almanac Office.—The Ephemeris, being issued every year, makes the volume of our publications larger than that of most observatories, and on that account anything like an equality in the number of packages exchanged can not be expected.

Bureau of Foreign and Domestic Commerce.—The cause of the excess of packages sent by this bureau through your exchange as compared with those received from it is, as you are probably aware, that this department has no adequate appropriation for the payment of postage on packages sent abroad and is therefore obliged to avail itself of the lesser expense of sending them through your Institution, while foreign Governments in most cases pay the postage on exchanges and mail them direct to this bureau.

Surgeon General's Office, War Department.—The volumes of the Index Catalogue, the only publication of this office now sent through the Smithsonian Exchange Service, have been forwarded annually to the libraries of the most important medical and other scientific institutions in foreign countries—including the universities in France and Germany—receiving, in return, the theses

> l dissertations of the universities and such publications as the other insti- ions issue. A very large number of exchanges are also received through agents in London, Paris, and elsewhere. The aid received from the Smith- ian Institution in forwarding and receiving these exchanges can not be restimated, but it is believed that we are receiving a full return for the changes that are now being sent out.
>
> *Inited States Patent Office.*—Your offer to endeavor to increase the foreign changes of this office through your Institution is appreciated, but it is re- ted to me by the librarian that we now receive all the publications which considered to be of value in the work of this bureau which can be secured that way.
>
> *Comptroller of the Currency.*—The packages from this bureau sent through Smithsonian Institution are annual reports of the comptroller, practically of which are addressed to individuals or corporations, from whom no returns expected.
>
> *Bureau of Navigation, Department of Commerce.*—The bureau receives ample urn for its publications sent abroad. Indeed, in cost and in numbers our eign exchanges exceed considerably our publications sent abroad. I have ticed, however, that it is the practice of our foreign correspondents to send eir packages, pamphlets, etc., directly to this bureau through the mails.

In my last report I stated that the service had not been put on prewar basis so far as the forwarding of consignments abroad was ncerned. Shipments are still suspended to Austria, Germany, ontenegro, Roumania, Russia, Serbia, and Turkey. The opinion as expressed in last year's report that it was not advisable to for- ard consignments to the above until the peace treaties with the emy countries were finally ratified by the United States and the ternal conditions in the other nations became more settled. Trade lations having been resumed with Germany, Austria, and Hun- ary, the Institution took steps to reopen exchange relations with em, and just before the close of the year shipments to Hungary ere resumed. Montenegro and Serbia now form part of the Serb- roat-Slovene State, and the Institution has taken up with the thorities of that State the question of the interchange of publica- ons. Internal conditions in Roumania having improved, the Rou- anian authorities have been asked if they are ready to renew the change of publications with the United States. Nothing can, wever, be done concerning the reopening of exchange relations ith either Russia or Turkey until conditions in those countries ach a more normal basis.

The Bulgarian foreign office, in reply to a letter from the Institu on concerning the reestablishment of exchange relations, writes, der date of July 3, that the Bulgarian Government eagerly accepts e proposal of the Institution. Shipments to that country will, erefore, be resumed in the early part of the next fiscal year.

An exchange of publications was inaugurated during the year with e Czecho-Slovak Republic, and the Polish Government will be approached concerning the exchange of publications as soon as conditions in that country become more settled.

Before the war shipments of international exchanges were made to Finland through the Russian exchange commission at Petrograd. Now, that Finland has become an independent State, consignments are being forwarded directly to that country.

The prompt dispatch of exchange consignments to foreign countries was greatly interfered with during the year owing to railroad freight embargoes and marine strikes. Transportation of boxes to New York was further interrupted owing to the severe winter. During the latter part of the year railroad freight became very much congested, especially in the vicinity of New York, which necessitated the placing of a general embargo on all freight. This required the suspension of the Institution's shipments for over a month. The official character of the work carried on by the Exchange Service was brought to the attention of the railroad authorities with the request that a permit be issued granting the Institution permission to forward its material to New York for transmission abroad. When the railroad began to exempt certain classes of freight from the embargo, the Institution was given authority to send its consignments.

The Institution has, in a few cases, rendered aid to various establishments in procuring publications relating to some particular subject in which especial interest was manifested. I may refer to one instance in this connection: The counselor in charge of foreign relations of the municipality of Prague wrote to the American Legation in that city that he wished to establish better cultural and intellectual relations between the University of Prague and the various American universities, and that with that end in view he was desirous of receiving catalogues giving the courses offered by those universities. The counselor also expressed a desire to receive documents concerning the functioning of the governments of American municipalities and their methods of solving economic, social, and political problems. The matter was brought to the attention of the more important American universities and of the governments of the larger cities in this country, from whom considerable material bearing on the subject was received and forwarded to Prague.

In March, 1920, a letter was received from Dr. S. G. de Vries, director of the Bureau Scientifique Central Néerlandais, Bibliothèque de l'Université, Leyden, stating that on account of the condition of his health he was unable to retain the management of the Dutch Central Scientific Bureau (the Netherlands Exchange Agency), and that Dr. H. H. R. Roelofs Heyermans, director of the Bibliothèque de l'Académie Technique, Delft, had succeeded him in the management of the Dutch bureau. Shipments for the Netherlands are therefore now forwarded to Delft. Dr. de Vries had been head of the Dutch scientific bureau for 18 years, during which time the interchange of publications between the Netherlands and the United States was conducted in a most efficient manner, and I desire to record here the Institution's appreciation of his services in promoting the interchange of publications between the Netherlands and the United States.

The National Committee of the United States for the Restoration of the University of Louvain in Belgium, which work is being conducted under the direction of Dr. Herbert Putnam, Librarian of Congress, collected and sent to the Institution for transmission to that university up to March, 1920, over 12,000 publications. The forwarding of these publications required 102 boxes, measuring 767 cubic feet and weighing 25,423 pounds. That shipment was the largest single consignment ever forwarded through the Exchange Service to any address at one time. It was greater than the combined bulk of the shipments sent abroad during the entire year 1871. The Institution is still receiving books for the University of Louvain, and these will be forwarded at a subsequent date.

Occasionally complaints are received from foreign correspondents that transportation charges are made on packages sent to them through exchange channels. Such a complaint was recently received from an Egyptian correspondent. The subject was taken up with the Government Publications Office at Cairo—the Egyptian Exchange Agency—which replied that henceforth that office would deliver all packages under Government frank free of expense to the recipients. This action on the part of the Government Publications Office is very gratifying, as one of the principal provisions of the Brussels Exchange Convention of 1886 would be defeated if any transportation charges were exacted from consignees. While not all countries were parties to that convention, most of them adhere to its provisions. I may add in this connection that packages received from abroad for distribution through the Smithsonian Exchange Service are sent to their destinations by mail under Government frank.

During the latter part of the year a letter was received from the Victorian Exchange Agency stating that the 16 boxes (Nos. 852–863, 9739–9740, 9794–9795) sent in its care under date of December 29, 1919, were lost at sea when the steamship *Marne* was wrecked off the coast of Panama. Four of these boxes contained the regular series of United States governmental documents for deposit in the public library of Victoria and in the library of the Commonwealth Parliament. Duplicate copies of these publications were forwarded to take the place of those lost. The contents of two of the boxes were for the Commonwealth War Memorials Library, and the Library of Congress, the sender, has taken steps to duplicate the material. The remaining 10 boxes contained miscellaneous publications for various addresses in Victoria. On account of the difficulty of determining the contents of the packages contained in these latter boxes, it was deemed best to let the matter rest until requests for the missing publications are received from the addressees.

During the year 2,359 boxes were used in forwarding exchanges to foreign agencies for distribution, being an increase of 1,556 over the number for the preceding 12 months. While this is a very large increase, the total number of boxes represents about the quantity used during a normal year.

Of the total number of boxes forwarded, 342 contained full sets of United States official documents for authorized depositories and 2,017 included departmental and other publications for depositories of partial sets and for miscellaneous correspondents.

The number of boxes sent to each foreign country is given in the following table:

Consignments of exchanges for foreign countries.

Country.	Number of boxes.	Country.	Number of boxes.
Argentina	50	Jamaica	5
Belgium	239	Japan	95
Bolivia	8	Korea	2
Brazil	39	Mexico	6
British colonies	9	Netherlands	64
British Guiana	2	New South Wales	47
Canada	24	New Zealand	45
Chile	27	Nicaragua	5
China	35	Norway	40
Colombia	23	Paraguay	1
Costa Rica	16	Peru	16
Cuba	6	Portugal	26
Denmark	54	Queensland	21
Dutch Guiana	2	Salvador	7
Ecuador	12	Siam	4
Egypt	12	Spain	44
Finland	10	Sweden	87
France	253	Switzerland	57
Great Britain and Ireland	481	Tasmania	11
Greece	24	South Australia	31
Guatemala	6	Trinidad	1
Haiti	8	Union of South Africa	39
Honduras	4	Uruguay	21
Hungary	75	Venezuela	17
India	59	Victoria	66
Italy	110	Western Australia	10

FOREIGN DEPOSITORIES OF UNITED STATES GOVERNMENTAL DOCUMENTS.

In accordance with treaty stipulations and under the authority of the congressional resolutions of March 2, 1867, and March 2, 1901, setting apart a certain number of documents for exchange with forign countries, there are now received for distribution to depositories broad 56 full sets of United States official publications and 37 parial sets, two depositories having been added during the year, as eferred to below.

An arrangement for an exchange of a full set of official documents etween the Governments of Czecho-Slovakia and the United States as entered into in the summer of 1919, but the details of transmision were not perfected until near the close of the fiscal year, and he first shipment to that country will be made during the month of uly, 1920. It might be added as a matter of record that the conignment will consist of 25 boxes containing governmental documents eceived at the Institution since January 27, 1919, the Czecho-Slovak overnment being requested to send to the United States copies of ts own documents covering the same period. It is understood that he publications from this country will be deposited in the Ministère e l'Instruction Publique at Prague.

In August, 1919, the State of Rio de Janeiro was added to the list f those countries receiving partial sets. The documents are deosited in the Bibliotheca da Assemblea Legislativa do Estado do io de Janeiro in Nictheroy.

Since Alsace-Lorraine has been restored to France the Bibliothèque niversitaire et Régionale de Strasbourg has been designated as the epository of the partial set sent to that province.

The depository in Finland since that country established its indeendence has been changed from the Chancery of Governor to the entral Library of the State, Helsingfors.

A complete list of the depositories is given below:

DEPOSITORIES OF FULL SETS.

RGENTINA: Ministerio de Relaciones Exteriores, Buenos Aires.
USTRALIA: Library of the Commonwealth Parliament, Melbourne.
USTRIA: Statistische Zentral-Kommission, Vienna.
ADEN: Universitäts-Bibliothek, Freiburg. (Depository of the State of Baden.)
AVARIA: Staats-Bibliothek, Munich.
ELGIUM: Bibliothèque Royale, Brussels.
RAZIL: Bibliotheca Nacional, Rio de Janeiro.
UENOS AIRES: Biblioteca de la Universidad Nacional de La Plata. (Depository of the Province of Buenos Aires.)
ANADA: Library of Parliament, Ottawa.
HILE: Biblioteca del Congreso Nacional, Santiago.
HINA: American-Chinese Publication Exchange Department, Shanghai Bureau of Foreign Affairs, Shanghai.
OLOMBIA: Biblioteca Nacional, Bogotá.
OSTA RICA: Oficina de Depósito y Canje Internacional de Publicaciones, San José.
UBA: Secretaria de Estado (Asuntos Generales y Canje Internacional), Habana.

CZECHO-SLOVAKIA: Ministère de l'Instruction Publique, Prague.
DENMARK: Kongelige Bibliotheket, Copenhagen.
ENGLAND: British Museum, London.
FRANCE: Bibliothèque Nationale, Paris.
GERMANY: Deutsche Reichstags-Bibliothek, Berlin.
GLASGOW: City Librarian, Mitchell Library, Glasgow.
GREECE: Bibliothèque Nationale, Athens.
HAITI: Secrétaire d'État des Relations Extérieures, Port au Prince.
HUNGARY: Hungarian House of Delegates, Budapest.
INDIA: Imperial Library, Calcutta.
IRELAND: National Library of Ireland, Dublin.
ITALY: Biblioteca Nazionale Vittorio Emanuele, Rome.
JAPAN: Imperial Library of Japan, Tokyo.
LONDON: London School of Economics and Political Science. (Depository of the London County Council.)
MANITOBA: Provincial Library, Winnipeg.
MEXICO: Instituto Bibliográfico, Biblioteca Nacional, Mexico.
NETHERLANDS: Bibliotheek van de Staten-Generaal, The Hague.
NEW SOUTH WALES: Public Library of New South Wales, Sydney.
NEW ZEALAND: General Assembly Library, Wellington.
NORWAY: Storthingets Bibliothek, Christiania.
ONTARIO: Legislative Library, Toronto.
PARIS: Préfecture de la Seine.
PERU: Biblioteca Nacional, Lima.
PORTUGAL: Bibliotheca Nacional, Lisbon.
PRUSSIA: Königliche Bibliothek, Berlin.
QUEBEC: Library of the Legislature of the Province of Quebec, Quebec.
QUEENSLAND: Parliamentary Library, Brisbane.
RUSSIA: Public Library, Petrograd.
SAXONY: Oeffentliche Bibliothek, Dresden.
SERBIA: Section Administrative du Ministère des Affaires Étrangères, Belgrade.
SOUTH AUSTRALIA: Parliamentary Library, Adelaide.
SPAIN: Servicio del Cambio Internacional de Publicaciones, Cuerpo Facultativo de Archiveros, Bibliotecarios y Arqueólogos, Madrid.
SWEDEN: Kungliga Biblioteket, Stockholm.
SWITZERLAND: Bibliothèque Fédérale Centrale, Berne.
TASMANIA: Parliamentary Library, Hobart.
TURKEY: Department of Public Instruction, Constantinople.
UNION OF SOUTH AFRICA: State Library, Pretoria, Transvaal.
URUGUAY: Oficina de Canje Internacional de Publicaciones, Montevideo.
VENEZUELA: Biblioteca Nacional, Caracas.
VICTORIA: Public Library of Victoria, Melbourne.
WESTERN AUSTRALIA: Public Library of Western Australia, Perth.
WÜRTTEMBERG: Landesbibliothek, Stuttgart.

DEPOSITORIES OF PARTIAL SETS.

ALBERTA: Provincial Library, Edmonton.
ALSACE-LORRAINE: Bibliothèque Universitaire et Régionale de Strasbourg, Strasbourg.
BOLIVIA: Ministerio de Colonización y Agricultura, La Paz.
BREMEN: Senatskommission für Reichs- und Auswärtige Angelegenheiten.
BRITISH COLUMBIA: Legislative Library, Victoria.
BRITISH GUIANA: Government Secretary's Office, Georgetown, Demerara.

GARIA: Minister of Foreign Affairs, Sofia.

LON: Colonial Secretary's Office (Record Department of the Library), Co-
mbo.

ADOR: Biblioteca Nacional, Quito.

PT: Bibliothèque Khédiviale, Cairo.

LAND: Central Library of the State, Helsingfors.

ATEMALA: Secretary of the Government, Guatemala.

MBURG: Senatskommission für die Reichs- und Auswärtigen Angelegenheiten.

SSE: Landesbibliothek, Darmstadt.

NDURAS: Secretary of the Government, Tegucigalpa.

IAICA: Colonial Secretary, Kingston.

ERIA: Department of State, Monrovia.

RENÇO MARQUEZ: Government Library, Lourenço Marquez.

ECK: President of the Senate.

DRAS, PROVINCE OF: Chief Secretary to the Government of Madras, Public
epartment, Madras.

LTA: Lieutenant Governor, Valetta.

TENEGRO: Ministère des Affaires Étrangères, Cetinje.

BRUNSWICK: Legislative Library, Fredericton.

FOUNDLAND: Colonial Secretary, St. John's.

ARAGUA: Superintendente de Archivos Nacionales, Managua.

THWEST TERRITORIES: Government Library, Regina.

A SCOTIA: Provincial Secretary of Nova Scotia, Halifax.

AMA: Secretaria de Relaciones Exteriores, Panama.

AGUAY: Oficina General de Inmigracion, Asuncion.

NCE EDWARD ISLAND: Legislative Library, Charlottetown.

MANIA: Academia Romana, Bucharest.

VADOR: Ministerio de Relaciones Exteriores, San Salvador.

M: Department of Foreign Affairs, Bangkok.

AITS SETTLEMENTS: Colonial Secretary, Singapore.

TED PROVINCES OF AGRA AND OUDH: Under Secretary to Government, Alla-
abad.

NNA: Bürgermeister-Amt der Haupt- und Residenz-Stadt.

INTERPARLIAMENTARY EXCHANGE OF OFFICIAL JOURNALS.

n the early part of the fiscal year the immediate exchange of the
cial journal was entered into with the Government of Czecho-
vakia. A complete list of the countries now taking part in this
nediate exchange is given below:

entine Republic.
tralia.
tria.
en.
gium.
via.
zil.
nos Aires (Province).
ada.
a Rica.
a.
cho-Slovakia.
mark.

France.
Great Britain.
Greece.
Guatemala.
Honduras.
Hungary.
Italy.
Liberia.
New South Wales.
New Zealand.
Peru.
Portugal.
Prussia.

Queensland.
Roumania.
Russia.
Serbia.
Spain.
Switzerland.
Transvaal.
Union of South Africa.
Uruguay.
Venezuela.
Western Australia.

It will be noted from the above that there are at present 37 countries with which this exchange is conducted. To some of the countries two copies of the Congressional Record are sent, one to the Upper and one to the Lower House of Parliament, the total number transmitted being 43.

FOREIGN EXCHANGE AGENCIES.

Since Finland became an independent State the president of the Delegation of the Scientific Societies of Finland, Helsingfors, has offered the services of that delegation as the Finnish exchange agency. This offer has been accepted and consignments intended for that country are now forwarded in care of the delegation.

Dr. Julius Pikler, of Budapest, whose services as Smithsonian agent for Hungary were, owing to the war, discontinued June 30, 1917, until further notice, was reappointed Hungarian exchange agent, to take effect July 1, 1920.

The Bureau Scientifique Central Néerlandais—the Dutch exchange agency—formerly under the Bibliothèque de l'Université, is now under the Bibliothèque de l'Académie Technique at Delft.

A complete list of the foreign exchange agencies or bureaus is given below. Shipments to those countries marked with an asterisk were still suspended at the close of the fiscal year.

Algeria, *via* France.
Angola, *via* Portugal.
Argentina: Comisión Protectora de Bibliotecas Populares, Lavalle 1216, Buenos Aires.
Austria:* Statistische Zentral-Kommission, Vienna.
Azores, *via* Portugal.
Belgium: Service Belge des Échanges Internationaux, Rue des Longs-Chariots 46, Brussels.
Bolivia: Oficina Nacional de Estadística, La Paz.
Brazil: Serviço de Permutações Internacionaes, Bibliotheca Nacional, Rio de Janeiro.
British Colonies: Crown Agents for the Colonies, London.
British Guiana: Royal Agricultural and Commercial Society, Georgetown.
British Honduras: Colonial Secretary, Belize.
Bulgaria: Institutions Scientifiques de S. M. le Roi de Bulgarie, Sofia.
Canary Islands, *via* Spain.
Chile: Servicio de Canjes Internacionales, Biblioteca Nacional, Santiago.
China: American-Chinese Publication Exchange Department, Shanghai Bureau of Foreign Affairs, Shanghai.
Colombia: Oficina de Canjes Internacionales y Reparto, Biblioteca Nacional, Bogotá.
Costa Rica: Oficina de Depósito y Canje Internacional de Publicaciones, San José.
Denmark: Kongelige Danske Videnskabernes Selskab, Copenhagen.
Dutch Guiana: Surinaamsche Koloniale Bibliotheek, Paramaribo.
Ecuador: Ministerio de Relaciones Exteriores, Quito.

Egypt: Government Publications Office, Printing Department, Bulaq, Cairo.

Finland: Delegation of the Scientific Societies of Finland, Helsingfors.

France: Service Français des Échanges Internationaux, 110 Rue de Grenelle, Paris.

Germany:* Amerika-Institut, Berlin, N. W. 7.

Great Britain and Ireland: Messrs. William Wesley & Son, 28 Essex Street, Strand, London.

Greece: Bibliothèque Nationale, Athens.

Greenland, *via* Denmark.

Guadeloupe, *via* France.

Guatemala: Instituto Nacional de Varones, Guatemala.

Guinea, *via* Portugal.

Haiti: Secrétaire d'État des Relations Extérieures, Port au Prince.

Honduras: Biblioteca Nacional, Tegucigalpa.

Hungary: Dr. Julius Pikler, Fövárosi Telekértéknyilvántartó Hivatal (City Land Valuation Office), Központi Városház, Budapest IV.

Iceland, *via* Denmark.

India: Superintendent of Stationery, Bombay.

Italy: Ufficio degli Scambi Internazionali, Biblioteca Nazionale Vittorio Emanuele, Rome.

Jamaica: Institute of Jamaica, Kingston.

Japan: Imperial Library of Japan, Tokyo.

Java, *via* Netherlands.

Korea: Government General, Keijo.

Liberia: Bureau of Exchanges, Department of State, Monrovia.

Lourenço Marquez: Government Library, Lourenço Marquez.

Luxemburg, *via* Germany.

Madagascar, *via* France.

Madeira, *via* Portugal.

Montenegro:* Ministère des Affaires Étrangères, Cetinge.

Mozambique, *via* Portugal.

Netherlands: Bureau Scientifique Central Néerlandais, Bibliothèque de l'Académie technique, Delft.

New Guinea, via Netherlands.

New South Wales: Public Library of New South Wales, Sydney.

New Zealand: Dominion Museum, Wellington.

Nicaragua: Ministerio de Relaciones Exteriores, Managua.

Norway: Kongelige Norske Frederiks Universitet Bibliotheket, Christiania.

Panama: Secretaria de Relaciones Exteriores, Panama.

Paraguay: Servicio de Canje Internacional de Publicaciones Sección Consular y de Comercio, Ministerio de Relaciones Exteriores, Asuncion.

Persia: Board of Foreign Missions of the Presbyterian Church, New York City.

Peru: Oficina de Reparto, Depósito y Canje Internacional de Publicaciones, Ministerio de Fomento, Lima.

Portugal: Serviço de Permutacões Internacionaes, Bibliotheca Nacional, Lisbon.

Queensland: Bureau of Exchanges of International Publications, Chief Secretary's Office, Brisbane.

Roumania: * Academia Romana, Bucharest.

Russia:* Commission Russe des Échanges Internationaux, Bibliothèque Publique, Petrograd.

Salvador: Ministerio de Relaciones Exteriores, San Salvador.

Serbia: * Section Administrative du Ministère des Affaires Etrangères, Belgrade.

never before represented in the collection. This monkey is a member of the only genus of short-tailed monkeys inhabiting the New World, and is very seldom seen in captivity. The species is, unfortunately, like some others of the more delicate American monkeys, very difficult to keep, and this specimen survived only two months after its arrival in Washington. Other animals in the La Varre collection were a brown capuchin monkey, two titi or squirrel monkeys, an ocelot, two margay cats, two snowy egrets, a scarlet ibis, an orange-winged parrot, two yellow-winged paroquets, and four tui paroquets. Mr. La Varre also brought to Washington with him from Manaos, Brazil, a large specimen of the rare and curious matamata turtle, presented to the National Zoological Park by his friend, Mr. A. T. S. Hore, of Manaos.

A second accession from Brazil was from Mr. Edward B. Kirk, American consular agent at Manaos. This lot included three large American egrets, a white-backed trumpeter, and two brocket deer. The quarantine regulations in force at the time unfortunately prohibited the landing of the deer, and these were returned to Mr. Kirk's place in Brazil. The white-backed trumpeter (*Psophia leucoptera*) is very unusual in collections and is the most important addition to the bird department made during the fiscal year.

Dr. W. M. Mann, of the Bureau of Entomology, during a short stay in Honduras, collected a number of valuable and interesting Central American animals which he brought to the park on his return. Included were a Mexican kinkajou, a mantled howler monkey (*Alouatta palliata*), a paca, a Honduras squirrel, two speckled agoutis, a Central American cooter, and a fine specimen of Rossignon's snapping turtle. Howler monkeys are exceptionally difficult to keep in captivity, and this specimen, a young example, did not long survive; but the remaining animals in Dr. Mann's collection are all in excellent condition.

Among the parrots received as gifts during the year were two species never before shown in the park. These were the lesser white-fronted parrot, presented by Mr. Alex Gregory, and the blue-backed parrotlet, from Mrs. Samuel Spencer, Washington, D. C.

Sixty individual donors contributed to the collection this year. The complete list is as follows:

Mr. John L. Barr, Washington, D. C., red-winged blackbird.
Mr. Bert Brooks, Washington, D. C., two alligators.
Mr. John A. Buckley, Fairfax, Va., woodchuck.
Mr. Granville Christman, Washington, D. C., screech owl.
Mrs. E. L. Conn, Washington, D. C., double yellow-head parrot.
Capt. Robert G. Cook, Washington, D. C., alligator.
Col. J. A. Crane, Washington, D. C., cockateel.
Mr. J. I. Cusick, Washington, D. C., two barn owls.
Mrs. C. E. Dornheim, Washington, D. C., bald eagle.

Mr. John W. Dudley, Washington, D. C., sparrow hawk.
Mr. D. L. Du Pre, Washington, D. C., garter snake.
Mr. W. A. Eaton, Washington, D. C., alligator.
Mrs. A. F. Enquist, Washington, D. C., two canaries.
Mr. Victor J. Evans, Washington, D. C., gray coatimundi.
Mr. Raymond T. Faunce, Washington, D. C., alligator.
Mr. Enos Ferguson, Washington, D. C., six starlings.
Dr. A. K. Fisher, Washington, D. C., chuck-walla.
Mr. H. Fitzinreuter, Washington, D. C., sparrow hawk.
Mr. R. F. Funkhauser, Washington, D. C., alligator.
Mr. Julian Greene, Washington, D. C., alligator.
Mr. Alex Gregory, Washington, D. C., lesser white-fronted parrot.
Miss Harriet Hackett, Baltimore, Md., double yellow-head parrot.
Mrs. Edith S. Hawes, Washington, D. C., alligator.
Mr. F. K. Heindrich, Washington, D. C., two gray foxes.
Mr. A. T. S. Hore, Manaos, Brazil, matamata turtle.
Mr. C. J. Hornberger, Washington, D. C., alligator.
Mr. L. M. Humphrey, Glen Echo, Md., queen snake.
Mr. Perry H. Jacob, Washington, D. C., Cooper's hawk.
Mr. Hiram F. Johnson, Washington, D. C., alligator.
Mr. James S. Kerkendall, Louisville, Ky., ferret.
Mr. Edward B. Kirk, Manaos, Brazil, white-backed trumpeter and three American egrets.
Mr. J. A. Krentzlin, Washington, D. C., black snake.
Mr. W. J. La Varre, jr., Washington, D. C., black-headed ouakari, brown capuchin, ocelot, orange-winged parrot, scarlet ibis, two titi monkeys, two margay cats, two yellow-winged paroquets, two snowy egrets, and four tui paroquets.
Mr. T. P. Lovering, Wilmington, N. C., coach-whip snake.
Mr. George Mackle, Washington, D. C., woodchuck.
Miss Genevieve Magee, Washington, D. C., alligator.
Dr. W. M. Mann, Washington, D. C., Mexican kinkajou, mantled howler monkey, Central American paca, Honduras squirrel, Rossignon's snapping turtle, Central American cooter, and two speckled agoutis.
Mrs. A. D. Marks, Washington, D. C., alligator.
Mr. J. C. Meyer, Washington, D. C., five canaries.
Mrs. Joseph F. Miller, Washington, D. C., soft-shelled turtle.
Mr. W. L. Peak, Washington, D. C., barn owl.
Mrs. Winnie Harward Phillips, Washington, D. C., three chameleons, four horned toads, and five whip-tailed lizards.
Mrs. Sylvanus Billings Pond, Washington, D. C., canary.
Mr. C. D. Reeder, Lorton, Va., barred owl.
Mr. B. H. Roberts, Washington, D. C., woodchuck.
Mr. Henry Roberts, Washington, D. C., woodchuck.
Dr. R. W. Shufeldt, Washington, D. C., spotted turtle and two box tortoises.
Mrs. R. W. Shufeldt, Washington, D. C., painted turtle.
Mrs. Samuel Spencer, Washington, D. C., four blue-backed parrotlets.
Rear Admiral Benjamin Tappan, Altha Hall, Va., cardinal, red-and-blue-and-yellow macaw, and blue-and-yellow macaw.
Mr. B. M. Taylor, Houston, Tex., two ringed turtledoves.
Miss L. F. Thompson, Washington, D. C., alligator.
Mr. Richard E. Tiller, Washington, D. C., wood duck.
Maj. G. O. Totten, jr., Washington, D. C., Yucatan jay, cedar waxwing, blue grosbeak, two Yucatan cardinals, two nonpareils, and three indigo buntings.

Mr. Titus Ulke, Washington, D. C., painted turtle.
Mr. Edward L. Weikert, Dickerson, Md., banded rattlesnake.
Mr. H. J. Wildeman, Titusville. Fla., barn owl.
Mr. Thomas Williams, Washington, D. C., barred owl.
Mr. W. N. Williams, Washington, D. C., chameleon.
Miss H. D. Wise, Washington, D. C., fish crow.

Births.—Fifty mammals were born and 72 birds were hatched in the park during the year. This record includes only such animals as are reared to a reasonable age, no account being made in these published statistics of young that live but a few days. The births include 1 hippopotamus, 1 Indian water buffalo, 1 yak, 3 llamas, 1 guanaco, 1 tahr, 2 Indian antelopes, 2 American elk, 5 European red deer, 1 barasingha deer, 1 hog deer, 4 Japanese deer, 1 fallow deer, 3 Virginia deer, 8 raccoons, 4 prairie dogs, 2 Peruvian wild guinea pigs, 3 great red kangaroos, 1 great gray kangaroo, 1 rufous-bellied wallaby, and 4 rhesus monkeys. No record was kept of the numerous domesticated guinea pigs and rabbits born during the year. The birds hatched were of the following species: Florida cormorant, black-crowned night heron, Canada goose, mallard, black duck, wood duck, redhead, peafowl, and bob-white quail.

The hippopotamus was born on May 31; it is a thrifty male, and is the second young from this same pair of animals. The nesting of the redhead duck is the first record of the breeding of this species in the park.

Exchanges.—In exchange for surplus animals born in the park there were received during the year 7 mammals, 133 birds, and 5 reptiles. The mammals included a zebu and a Burmese stag from the gardens of the Zoological Society of Philadelphia, and 2 black spider monkeys, 1 chacma baboon, 1 Canadian porcupine, and a snow leopard from miscellaneous sources. Of particular interest among the birds are many of the characteristic species of Europe: Wood pigeon, blackbird, robin redbreast, bullfinch, hawfinch, yellowhammer, goldfinch, siskin, greenfinch, bramblefinch, and jackdaw. Neotropical birds received in exchange include the black-necked screamer, upland goose, roseate spoonbill, white ibis, seedeater, yellow-backed cacique, Yucatan jay, blue tanager, red-crowned parrot, and Mexican green macaw. Species new to the collection from Asia are the Baikal teal and the silver-eared hill-tit. One of the most valuable birds received in exchange is a fine example of the single-wattled cassowary which is apparently referable to a little-known species, *Casuarius philipi*, of New Guinea. Five specimens of a large South American lizard, *Tupinambis teguixin*, were also added to the collection.

Purchases.—The lack of sufficient funds for the purchase of animals made it impossible to add to the collection many desirable species offered for sale from time to time. Four young harbor seals, a Brazilian ocelot, and a collared peccary from Texas were the only mammals bought during the year. A few waterfowl were purchased for the North American lake, including 2 blue geese, 4 Hutchins's geese, 1 canvasback duck, 3 lesser scaups, 2 gadwalls, and 4 male shoveller ducks. A few native birds of prey and a single pine snake were also purchased.

Transfers.—The Biological Survey of the Department of Agriculture contributed to the collection some important animals taken for various purposes by its field agents. The most valuable of these is a lot of 6 little brown cranes (*Grus canadensis*), a species not hitherto exhibited in Washington. Other animals transferred from the Biological Survey were 9 western box-turtles from the Chiracahua Mountains, Ariz.; 2 great horned owls from Long Island, N. Y.; and a collection of small mammals, including species of *Peromyscus*, *Microtus*, and *Perognathus*. In cooperation with the State Livestock Board of Utah, the survey also contributed, through Mr. George E. Holman, 2 young gray wolves from Grand County, Utah.

Captured in the park.—Two Virginia opossums and 30 small birds, captured in the park, were added to the collection. Among the more interesting birds so taken are examples of the European starling and Baltimore oriole.

Deposited.—The most interesting specimens received on deposit during the year are a fine male Brazilian brocket from Mrs. Lindon W. Bates, New York City; and an American marten from Mr. Ernest Thompson Seton, Greenwich, Conn. Eighteen alligators were carried over winter for the Pan American Union.

REMOVALS.

The surplus animals sent away in exchange during the year numbered 54, of which 29 were mammals and 25 birds. The exchange value was $3,017.50, as compared with $3,240.70 worth of animals exchanged in 1919. Most of the surplus animals were born in the park, and the shipments included 6 bison, 3 barasingha deer, 3 red deer, 5 Japanese deer, 1 hog deer, 4 llamas, 2 guanacos, 2 gray wolves, 3 red kangaroos, 4 peafowl, 3 golden pheasants, 10 Canada geese, 1 Mandarin duck, 1 bald eagle, and 6 black-crowned night-herons. A number of animals on deposit were returned to owners.

The death rate during the year, while slightly above that of 1919, was nevertheless very low, and was approximately equal to that of 1918. The specimen of the rare brown hyena (*Hyæna brunnea*) deposited in the park by Mr. E. S. Joseph in September, 1917, died of acute pneumonia on November 14, 1919. The male Philippine deer (*Rusa philippinus*) presented to the park October 17, 1904, by Admiral Robley D. Evans, died of senile cachexia October 22, 1919.

This animal was at least 4 years of age when it arrived at the park and was therefore fully 19 years old at the time of its death. The Grevy's zebra stallion presented by Emperor Menelik of Abyssinia to President Roosevelt, which reached the park November 24, 1904, died, after over 15 years of life in Washington, on December 4, 1919. A pair of Japanese monkeys received August 4, 1904, fully adult at the time, died during the year, the female on December 7, 1919, and the male on January 21, 1920. Autopsies in both cases showed splenic tumor as the immediate cause of death. A California lynx died from pyemia on September 23, 1919, almost 14 years after the date of its arrival, October 19, 1905. A female coyote, received April 26, 1906, was mercifully killed on June 10, 1920, as it was virtually helpless with disabilities of old age. An aged female Florida otter, received July 20, 1907, died on March 20, 1920, almost 13 years after its arrival in the park. Among birds long in the collection, a demoiselle crane, received July 2, 1903, was accidentlly killed October 18, 1920; a crowned crane, received on May 25, 1905, died from enteritis December 26, 1919; and a red-and-blue macaw, received January 26, 1907, died on September 8, 1919.

Other serious losses during the year include a wombat, from pneumonia, August 5, 1919; the waterbuck, killed as unfit for exhibition, on November 5, 1919, after nearly 10 years of life in the antelope house; a hornbill, from enteritis, August 19, 1919; and our last specimen of the blue-headed quail dove, January 16, 1920.

Post-mortem examinations were made by the pathological division of the Bureau of Animal Industry and, in two cases, by the Army Medical Museum. The following list shows the results of autopsies, the cases being arranged by groups:

CAUSES OF DEATH.

MAMMALS.

Marsupialia: Pneumonia, 1; tuberculosis, 1; pyemia, 1; peritonitis, 1; multiple tumors in lungs, 1.

Carnivora: Pneumonia, 2; gastroenteritis, 6; pyemia, 1; metritis, 1.

Rodentia: Tuberculosis, 1; enteritis, 1; hepatitis and nephritis, 1.

Primates: Pneumonia and gastroenteritis, 1; enteritis, 1; gastroenteritis, 1; colitis, 1; dysentery, 1; tumor of spleen, 2.

Artiodactyla: Tuberculosis, 2; colitis, 1; fermentation colic, 1; senile cachexia, 1.

Perissodactyla: Acute gastro-enteritis, 1.

BIRDS.

Ciconiiformes: Septicemia, 1; impaction of proventriculus, 1; accident, 2.

Anseriformes: Tuberculosis, 4; enteritis, 5; impaction of proventriculus, 1; anemia, 2; septicemia, 4; pericarditis, 1; no cause found, 2.

Falconiformes: Tuberculosis, 1.

Galliformes: Inflammation of rectum and cloaca, 1; anemia, 1; pyemia, 1; necrosis of ceca, 1; sarcoma, 1; accident, 1; no cause found, 2.

Gruiformes: Tuberculosis, 1; enteritis, 1; no cause found, 1.

Charadriiformes: Catarrhal enteritis, 1.

Psittaciformes: Tuberculosis, 1; enteritis, 3; gastritis, 1.

Coraciiformes: Enteritis, 1; no cause found, 1.

Passeriformes: Tuberculosis, 1; catarrhal enteritis, 1; no cause found, 4.

REPTILES.

Enteritis, 1.

y-nine specimens, including 15 mammals, 21 birds, and 3 rep- special scientific importance were transferred after death to ted States National Museum for permanent preservation. nkeys, especially desired for study, were sent immediately ath to the Army Medical Museum. Skins of birds to the of 25 were added to the collection of "dealers' cage birds" reference in the office of the superintendent, National Zoo- Park.

ANIMALS IN THE COLLECTION JUNE 30, 1920.

MAMMALS.

MARSUPIALIA.

possum (*Didelphis virgin-*	8
devil (*Sarcophilus har-*	2
opossum (*Trichosurus vul-*	8
alanger (*Trichosurus fulig-*	2
d rock wallaby (*Petrogale ta*)	3
d wallaby (*Macropus bil-*)	5
laby (*Macropus parma*)	1
d wallaby (*Macropus bicolor*)	1
kangaroo (*Macropus gigan-*	4
kangaroo (*Macropus mel-*	2
(*Macropus robustus*)	1
roo (*Macropus rufus*)	8

CARNIVORA.

ar (*Ursus middendorffi*)	1
insula bear (*Ursus gyas*)	2
ar (*Ursus dalli*)	1
ear (*Ursus kidderi*)	2
ear (*Ursus arctos*)	4
ar (*Ursus horribilis*)	2
zzly (*Ursus apache*)	1
bear (*Ursus thibetanus*)	1
(*Ursus americanus*)	3
ck bear (*Ursus americanus r*)	1
bear (*Ursus americanus mum*)	2
ar (*Ursus floridanus*)	2
ar (*Ursus emmonsii*)	1
(*Helarctos malayanus*)	1
(*Melursus ursinus*)	1
(*Thalarctos maritimus*)	2
nis dingo)	1
g (*Canis familiaris*)	2
(*Canis nubilus*)	10
wolf (*Canis floridanus*)	1
's wolf (*Canis frustror*)	2
anis latrans)	2

CARNIVORA—continued.

Red fox (*Vulpes fulva*)	5
Gray fox (*Urocyon cinereoargenteus*)	6
Cacomistle (*Bassariscus astutus*)	2
Raccoon (*Procyon lotor*)	15
Gray coatimundi (*Nasua narica*)	2
Kinkajou (*Potos flavus*)	2
Mexican kinkajou (*Potos flavus aztecus*)	1
Marten (*Martes americana*)	1
Ferret (*Mustela furo*)	1
Tayra (*Tayra barbara*)	1
Skunk (*Mephitis nigra*)	1
American badger (*Taxidea taxus*)	2
European badger (*Meles meles*)	1
Florida otter (*Lutra canadensis vaga*)	2
African civet (*Viverra civetta*)	1
Genet (*Genetta genetta*)	1
Spotted hyena (*Crocuta crocuta*)	1
Striped hyena (*Hyæna hyæna*)	2
African cheetah (*Acinonyx jubatus*)	2
Lion (*Felis leo*)	4
Bengal tiger (*Felis tigris*)	1
Manchurian tiger (*Felis tigris longipilis*)	2
Leopard (*Felis pardus*)	1
East African leopard (*Felis pardus suahelica*)	1
Jaguar (*Felis onca*)	1
Brazilian ocelot (*Felis pardalis brasiliensis*	1
Margay cat (*Felis tigrina*)	1
Snow leopard (*Felis uncia*)	1
Mexican puma (*Felis azteca*)	2
Mountain lion (*Felis hippolestes*)	2
Canada lynx (*Lynx canadensis*)	2
Northern wild cat (*Lynx uinta*)	8
Bay lynx (*Lynx rufus*)	2

PINNIPEDIA.

California sea lion (*Zalophus californianus*)	2
Harbor seal (*Phoca vitulina*)	1

RODENTIA.

Woodchuck (*Marmota monax*)	5
Dusky marmot (*Marmota flaviventris obscura*)	1

RODENTIA—continued.

Prairie dog (*Cynomys ludovicianus*)	8
Honduras squirrel (*Sciurus boothiæ*)	1
Fox squirrel (*Sciurus niger*)	1
Albino squirrel (*Sciurus carolinensis*)	2
Dusky pocket mouse (*Perognathus flavescens perniger*)	3
American beaver (*Castor canadensis*)	1
White-footed mouse (*Peromyscus leucopus noveboracensis*)	2
Montana white-footed mouse (*Peromyscus leucopus aridulus*)	2
Nebraska white-footed mouse (*Peromyscus maniculatus osgoodi*)	2
Canadian Porcupine (*Erethizon dorsatum*)	1
Yellow-haired porcupine (*Erethizon epixanthum*)	1
Coypu (*Myocastor coypus*)	6
Paca (*Cuniculus paca*)	3
Central American paca (*Cuniculus paca virgatus*)	1
Mexican agouti (*Dasyprocta mexicana*)	1
Speckled agouti (*Dasyprocta punctata*)	2
Azara's agouti (*Dasyprocta azaræ*)	2
Crested agouti (*Dasyprocta cristata*)	2
Peruvian guinea pig (*Cavia tschudii pallidior*)	5
Guinea pig (*Cavia porcellus*)	23
Capybara (*Hydrochærus hydrochæris*)	1

LAGOMORPHA.

Domestic rabbit (*Oryctolagus cuniculus*)	18

PRIMATES.

Black spider monkey (*Ateles ater*)	2
Gray spider monkey (*Ateles geoffroyi*)	2
White-throated capuchin (*Cebus capucinus*)	2
Brown capuchin (*Cebus fatuellus*)	1
Margarita capuchin (*Cebus margaritæ*)	1
Titi monkey (*Saimiri sciureus*)	2
Chacma (*Papio porcarius*)	2
Hamadryas baboon (*Papio hamadryas*)	1
Mandrill (*Papio sphinx*)	1
Drill (*Papio leucophæus*)	1
Moor macaque (*Cynopithecus maurus*)	1
Brown macaque (*Macaca speciosa*)	2
Burmese macaque (*Macaca andamanensis*)	1
Rhesus monkey (*Macaca rhesus*)	32
Bonnet monkey (*Macaca sinica*)	1
Javan macaque (*Macaca mordax*)	1
Philippine macaque (*Macaca syrichta*)	1
Sooty mangabey (*Cercocebus fuliginosus*)	2
Green guenon (*Lasiopyga callitrichus*)	1
Vervet guenon (*Lasiopyga pygerythra*)	2
Mona (*Lasiopyga mona*)	3
Roloway guenon (*Lasiopyga roloway*)	1
Patas monkey (*Erythrocebus patas*)	1
Chimpanzee (*Pan troglodytes*)	1

ARTIODACTYLA.

Wild boar (*Sus scrofa*)	1
Wart hog (*Phacochærus æthiopicus*)	2
Collared peccary (*Pecari angulatus*)	1
Hippopotamus (*Hippopotamus amphibius*)	3
Bactrian camel (*Camelus bactrianus*)	2
Arabian camel (*Camelus dromedarius*)	2
Guanaco (*Lama huanachus*)	3
Llama (*Lama glama*)	9
Alpaca (*Lama pacos*)	1
Vicuña (*Lama vicugna*)	1
Fallow deer (*Dama dama*)	4
Axis deer (*Axis axis*)	4
Hog deer (*Hyelaphus porcinus*)	3
Sambar (*Rusa unicolor*)	2
Barasingha (*Rucervus duvaucelii*)	7
Burmese deer (*Rucervus eldii*)	1
Japanese deer (*Sika nippon*)	11
Red deer (*Cervus elaphus*)	20
Kashmir deer (*Cervus hanglu*)	4
Bedford deer (*Cervus xanthopygus*)	6
American elk (*Cervus canadensis*)	8
Virginia deer (*Odocoileus virginianus*)	10
Mule deer (*Odocoileus hemionus*)	2
Black-tailed deer (*Odocoileus columbianus*)	3
Brazilian brocket (*Mazama simplicicornis*)	1
Prong-horned antelope (*Antilocapra americana*)	1
Blesbok (*Damaliscus albifrons*)	1
White-tailed gnu (*Connochætes gnou*)	1
Indian antelope (*Antilope cervicapra*)	8
Nilgai (*Boselaphus tragocamelus*)	2
East African eland (*Taurotragus oryx livingstonii*)	3
Angora goat (*Capra hircus*)	1
Tahr (*Hemitragus jemlahicus*)	3
Aoudad (*Ammotragus lervia*)	1
Rocky Mountain sheep (*Ovis canadensis*)	5
Arizona mountain sheep (*Ovis canadensis gaillardi*)	1
Barbados sheep (*Ovis aries*)	5
Zebu (*Bos indicus*)	2
Yak (*Poëphagus grunniens*)	5
American bison (*Bison bison*)	16
Indian buffalo (*Bubalus bubalis*)	3

PERISSODACTYLA.

Brazilian tapir (*Tapirus terrestris*)	2
Mongolian horse (*Equus przewalskii*)	1
Grant's zebra (*Equus burchelli granti*)	1
Grevy's zebra (*Equus grevyi*)	1
Zebra-horse hybrid (*Equus grevyi-caballus*)	1
Zebra-ass hybrid (*Equus grevyi-asinus*)	1

PROBOSCIDEA.

Abyssinian elephant (*Loxodonta africana oxyotis*)	1
Sumatran elephant (*Elephas sumatranus*)	2

BIRDS.

RATITÆ.

an ostrich (*Struthio aus-*	4
ostrich (*Struthio molybdo-*	1
americana)	2
ssowary (*Casuarius phil-*	1
iceius novæhollandiæ)	2

CICONIIFORMES.

hite pelican (*Pelecanus ery- hos*)	9
white pelican (*Pelecanus us*)	2
ican (*Pelecanus roseus*)	2
pelican (*Pelecanus conspic-*	2
ican (*Pelecanus occiden-*	2
morant (*Phalacrocorax au- danus*)	20
e heron (*Ardea occiden-*	1
eron (*Ardea herodias*)	1
n (*Ardea goliath*)	1
gret (*Casmerodius egretta*)	3
t (*Egretta candidissima*)	3
ed night heron (*Nycticorax x nævius*)	30
ochlearius cochlearius)	2
(*Ciconia ciconia*)	2
(*Ciconia nigra*)	1
d ibis (*Carphibis spini-*	1
(*Threskiornis æthiopicus*)	3
(*Guara alba*)	12
(*Guara rubra*)	2
onbill (*Ajaia ajaja*)	5
flamingo (*Phœnicopterus*	1

ANSERIFORMES.

nas platyrhynchos)	19
black duck (*Anas platyr- var.*)	3
(*Anas rubripes*)	24
haulelasmus streperus)	2
idgeon (*Mareca penelope*)	8
areca americana)	7
d teal (*Nettion caro-*	7
eal (*Nettion crecca*)	10
(*Nettion formosum*)	1
teal (*Querquedula discors*)	6
Querquedula querquedula)	1
teal (*Querquedula cyan-*	1
drake (*Casarca ferruginea*)	1
Spatula clypeata)	4
fila acuta)	8
(*Aix sponsa*)	15
duck (*Dendronessa galeri-*	19
(*Marila valisineria*)	2

ANSERIFORMES—continued.

Redhead (*Marila americana*)	8
Ring-necked duck (*Marila collaris*)	1
Lesser scaup duck (*Marila affinis*)	8
Rosy-billed pochard (*Metopiana peposaca*)	1
Snow goose (*Chen hyperboreus*)	2
Greater snow goose (*Chen hyperboreus nivalis*)	2
Blue goose (*Chen cærulescens*)	7
White-fronted goose (*Anser albifrons*)	3
American white-fronted goose (*Anser albifrons gambeli*)	3
Bar-headed goose (*Eulabeia indica*)	1
Canada goose (*Branta canadensis*)	19
Hutchins's goose (*Branta canadensis hutchinsii*)	9
Cackling goose (*Branta canadensis minima*)	2
Brant (*Branta bernicla glaucogastra*)	7
Barnacle goose (*Branta leucopsis*)	3
Spur-winged goose (*Plectropterus gambensis*)	2
Black-bellied tree duck (*Dendrocygna autumnalis*)	6
White-faced tree duck (*Dendrocygna viduata*)	8
Coscoroba swan (*Coscoroba coscoroba*)	1
Mute swan (*Cygnus gibbus*)	4
Whistling swan (*Olor columbianus*)	1
Trumpeter swan (*Olor buccinator*)	1
Black swan (*Chenopis atrata*)	3

FALCONIFORMES.

South American condor (*Vultur gryphus*)	1
California condor (*Gymnogyps californianus*)	3
Turkey vulture (*Cathartes aura*)	4
Black vulture (*Coragyps urubu*)	2
King vulture (*Sarcoramphus papa*)	2
Secretary bird (*Sagittarius serpentarius*)	1
Griffon vulture (*Gyps fulvus*)	1
Cinereous vulture (*Aegypius monachus*)	2
Caracara (*Polyborus cheriway*)	2
Cooper's hawk (*Accipiter cooperi*)	1
Wedge-tailed eagle (*Uroaëtus audax*)	2
Golden eagle (*Aquila chrysaëtos*)	3
Bald eagle (*Haliæetus leucocephalus*)	13
Alaskan bald eagle (*Haliæetus leucocephalus alascanus*)	1
Red-tailed hawk (*Buteo borealis*)	5
Sparrow hawk (*Falco sparverius*)	2

GALLIFORMES.

Razor-billed curassow (*Mitu mitu*)	2
Mexican curassow (*Crax globicera*)	2
Chicken-guinea hybrid (*Gallus* × *Numida*)	1
Wild turkey (*Meleagris gallopavo silvestris*)	1
Peafowl (*Pavo cristatus*)	34

GALLIFORMES—continued.

Peacock pheasant (*Polyplectron bicalcaratum*)	1
Silver pheasant (*Gennæus nycthemerus*)	1
Ring-necked pheasant (*Phasianus torquatus*)	1
Bobwhite (*Colinus virginianus*)	1
Scaled quail (*Callipepla squamata*)	4
Gambel's quail (*Lophortyx gambelii*)	2
Valley quail (*Lophortyx californica vallicola*)	6

GRUIFORMES.

American coot (*Fulica americana*)	3
South Island weka rail (*Ocydromus australis*)	8
Short-winged weka (*Ocydromus brachypterus*)	2
Earl's weka (*Ocydromus earli*)	1
Whooping crane (*Grus americana*)	1
Sandhill crane (*Grus mexicana*)	3
Little brown crane (*Grus canadensis*)	6
White-necked crane (*Grus leucauchen*)	1
Indian white crane (*Grus leucogeranus*)	1
Lilford's crane (*Grus lilfordi*)	2
Australian crane (*Grus rubicunda*)	1
Demoiselle crane (*Anthropoides virgo*)	5
Crowned crane (*Balearica pavonina*)	1
White-backed trumpeter (*Psophia leucoptera*)	1
Cariama (*Cariama cristata*)	1

CHARADRIIFORMES.

Great black-backed gull (*Larus marinus*)	1
Herring gull (*Larus argentatus*)	1
Laughing gull (*Larus atricilla*)	2
Australian crested pigeon (*Ocyphaps lophotes*)	1
Bronze-wing pigeon (*Phaps chalcoptera*)	1
Wonga-wonga pigeon (*Leucosarcia picata*)	8
Wood pigeon (*Columba palumbus*)	7
Mourning dove (*Zenaidura macroura*)	1
Zebra dove (*Geopelia striata*)	9
Bar-shouldered dove (*Geopelia humeralis*)	2
Inca dove (*Scardafella inca*)	3
Ringed turtledove (*Streptopelia risoria*)	14

PSITTACIFORMES.

Kea (*Nestor notabilis*)	5
Roseate cockatoo (*Kakatoe roseicapilla*)	10
Bare-eyed cockatoo (*Kakatoe gymnopis*)	3
Leadbeater's cockatoo (*Kakatoe leadbeateri*)	1
White cockatoo (*Kakatoe alba*)	2
Sulphur-crested cockatoo (*Kakatoe* [redacted]*alerita*)	2

PSITTACIFORMES—continued.

Great red-crested cockatoo (*Kakatoe moluccensis*)	1
Mexican green macaw (*Ara mexicana*)	2
Blue-and-yellow macaw (*Ara ararauna*)	2
Red-and-blue-and-yellow macaw (*Ara macao*)	8
Red-and-blue macaw (*Ara chloroptera*)	1
Thick-billed parrot (*Rhynchopsitta pachyrhyncha*)	2
Haitian paroquet (*Aratinga chloroptera*)	1
Yellow-winged paroquet (*Tirica virescens*)	2
Tui paroquet (*Brotogeris stthomae*)	4
Blue-backed parrotlet (*Psittacula viida*)	1
Yellow-naped parrot (*Amazona auropalliata*)	2
Yellow-cheeked parrot (*Amazona autumnalis*)	1
Orange-winged parrot (*Amazona amazonica*)	1
Red-crowned parrot (*Amazona viridigenalis*)	6
Double yellow-head parrot (*Amazona oratrix*)	10
Yellow-headed parrot (*Amazona ochrocephala*)	1
Yellow-shouldered parrot (*Amazona barbadensis*)	1
Festive parrot (*Amazona festiva*)	1
White-fronted parrot (*Amazona albifrons*)	1
Lesser white-fronted parrot (*Amazona albifrons .nana*)	1
Santo Domingo parrot (*Amazona ventralis*)	2
Cuban parrot (*Amazona leucocephala*)	1
Gray parrot (*Psittacus erithacus*)	1
Lesser vasa parrot (*Coracopsis nigra*)	1
Black-tailed paroquet (*Polytelis melanura*)	1
Ring-necked paroquet (*Conurus torquatus*)	5
Grass paroquet (*Melopsittacus undulatus*)	2

CORACIIFORMES.

Giant kingfisher (*Dacelo gigas*)	2
Short-keeled toucan (*Ramphastos piscivorus brevicarinatus*)	1
Barred owl (*Strix varia*)	9
Screech owl (*Otus asio*)	4
Great horned owl (*Bubo virginianus*)	7
Western horned owl (*Bubo virginianus pallescens*)	1
American barn owl (*Tyto perlata pratincola*)	6

PASSERIFORMES.

Silver-eared hill-tit (*Mesia argentauris*)	3
Red-billed hill-tit (*Liothrix luteus*)	10
Black-gorgeted laughing-thrush (*Garrulax pectoralis*)	8

SERIFORMES—continued.

l bulbul (*Otocompsa leuco-*	3
obin (*Erithacus rubecula*)	1
sh (*Hylocichla guttata pal-*	1
lackbird (*Turdus merula*)	3
esticus migratorius)	1
ockingbird (*Mimus poly- ucopterus*)	1
wing (*Bombycilla cedro-*	1
ven (*Corvus corax*)	1
crow (*Corvus coronoides*)	1
Corvus ossifragus)	1
orvus monedula)	6
(*Cissilopha yucatanica*)	5
yanocitta cristata)	3
Xanthoura luxuosa)	1
gray jumper (*Struthidea*	1
turnus vulgaris)	10
ager (*Ramphocelus dimidi-*	2
er (*Thraupis cana*)	3
eaver (*Pyromelana afra*)	1
weaver (*Foudia madagas-*	4
finch (*Amandava aman-*	5
ch (*Munia punctulata*)	9
d nun (*Munia maja*)	8
(*Munia oryzivora*)	8
finch (*Munia oryzivora*)	1
Gouldian finch (*Poëphila*	8
(*Tæniopygia castanotis*)	4
finch (*Amadina fasciata*)	7
red-wing (*Agelaius phœni- mondi*)	2
riole (*Icterus galbula*)	2

PASSERIFORMES—continued.

Purple grackle (*Quiscalus quiscula*)	7
Black-tailed hawfinch (*Eophona melanura*)	1
Bullfinch (*Pyrrhula pyrrhula*)	2
Greenfinch (*Chloris chloris*)	8
Yellowhammer (*Emberiza citrinella*)	5
European goldfinch (*Carduelis carduelis*)	1
Chaffinch (*Fringilla cœlebs*)	1
Bramblefinch (*Fringilla montifringilla*)	6
European siskin (*Spinus spinus*)	8
Mexican goldfinch (*Astragalinus psaltria mexicanus*)	1
House finch (*Carpodacus mexicanus frontalis*)	4
Purple finch (*Carpodacus purpureus*)	8
Canary (*Serinus canarius*)	9
Green singing finch (*Serinus icterus*)	1
Slate-colored junco (*Junco hyemalis*)	8
Tree sparrow (*Spizella monticola*)	1
White-throated sparrow (*Zonotrichia albicollis*)	4
Song sparrow (*Melospiza melodia*)	1
San Diego song sparrow (*Melospiza melodia cooperi*)	5
Fox sparrow (*Passerella iliaca*)	8
Towhee (*Pipilo erythrophthalmus*)	1
California towhee (*Pipilo crissalis*)	5
Saffron finch (*Sicalis flaveola*)	3
Seed-eater (*Sporophila gutturalis*)	2
Nonpareil (*Passerina ciris*)	1
Indigo bunting (*Passerina cyanea*)	8
Blue grosbeak (*Guiraca cærulea*)	1
Red-crested cardinal (*Paroaria cucullata*)	1
Cardinal (*Cardinalis cardinalis*)	2
Yucatan cardinal (*Cardinalis cardinalis yucatanicus*)	1

REPTILES.

(*Alligator mississipiensis*)	30
Tupinambis teguixin)	5
er (*Heloderma suspectum*)	6
d (*Phrynosoma cornutum*)	8
n (*Python molurus*)	3
(*Eunectes murinus*)	2
ictor (*Constrictor constric-*	4
(*Coluber constrictor*)	1
ake (*Elaphe quadrivittata*)	1
e (*Natrix sipedon*)	4
e (*Natrix septemvittata*)	1
ke (*Thamnophis sirtalis*)	2
(*Agkistrodon piscivorus*)	1
tler (*Sistrurus miliarius*)	1
urtle (*Chelydra serpentina*)	2
s snapping turtle (*Chelydra nii*)	1

Spotted turtle (*Clemmys guttata*)	1
Box-tortoise (*Terrapene carolina*)	2
Western box-tortoise (*Terrapene ornata*)	4
Painted turtle (*Chrysemys picta*)	1
Cooter (*Pseudemys scripta*)	1
Florida cooter (*Pseudemys floridana*)	1
Central American cooter (*Pseudemys ornata*)	1
Gopher tortoise (*Gopherus polyphemus*)	2
Duncan Island tortoise (*Testudo ephippium*)	1
Albemarle Island tortoise (*Testudo vicina*)	1
Matamata turtle (*Chelys fimbriata*)	1
Soft-shelled turtle (*Amyda ferox*)	1

STATEMENT OF THE COLLECTION.

ACCESSIONS DURING THE YEAR.

	Mammals.	Birds.	Reptiles.	Total.
Presented	21	65	41	127
Born and hatched in National Zoological Park	50	72		122
Received in exchange	7	133	5	145
Purchased	6	33	1	40
Transferred from other Government departments	11	8	9	28
Captured in National Zoological Park	2	30		32
Deposited	5	1	18	24
Total	102	342	74	518

SUMMARY.

Animals on hand July 1, 1919	1,336
Accessions during the year	518
Total animals handled	1,854
Deduct loss (by exchange, death, and return of animals on deposit)	427
Animals on hand June 30, 1920	1,427

Class.	Species.	Individuals.
Mammals	166	496
Birds	225	847
Reptiles	28	84
Total, June 30, 1920	419	1,427

It will be interesting at this time to submit figures showing the comparative size of the collection at the close of each fiscal year since the foundation of the park. The years and numbers of animals are as follows:

1892	448	1907	1,193
1893	504	1908	1,402
1894	510	1909	1,416
1895	520	1910	1,424
1896	553	1911	1,414
1897	567	1912	1,551
1898	549	1913	1,468
1899	675	1914	1,362
1900	839	1915	1,397
1901	878	1916	1,383
1902	883	1917	1,223
1903	1,000	1918	1,247
1904	1,111	1919	1,336
1905	1,307	1920	1,427
1906	1,272		

The number of animals is now 124 under that of the record year (1912), but is greater than has been maintained since 1913. The monetary and scientific value of the collection is, however, very much greater than ever before.

VISITORS.

The attendance for the fiscal year, as determined by count and estimate, was 2,229,605, a daily average of 6,108. This is the first time that the official records have gone above two millions. The greatest number of visitors in any one month was 402,403, in April, 1920, an average per day of 13,413. The largest single day's attendance in the history of the park occurred in this month, on Sunday the 11th, when 95,000 people were admitted to the gates. The other three Sundays in April show attendance records of 25,000, 87,000, and 55,000.

The attendance by months was as follows: In 1919: July, 125,700; August, 230,255; September, 268,941; October, 205,398; November, 204,944; December, 74,161. In 1920: January, 55,547; February, 27,099; March, 203,803; April, 402,403; May, 265,604; June, 165,750.

Ninety-six schools and classes visited the park during the year, with a total of 8,959 individuals. As usual, these came largely from the District of Columbia, Maryland, and Virginia; but several were from States as distant as Pennsylvania and Massachusetts.

IMPROVEMENTS.

The most needed improvement completed during the year is the public-comfort station at the Harvard Street entrance. This building is set into the steep hillside just inside the gate, and is so nearly hidden by the natural growth of trees, especially by the low-sweeping branches of some fine beeches, that comparatively little planting was necessary to improve the ground around it.

The row of old wooden cages along the hill just north of the bird house, the first cages used in the park, some of which were originally brought from the Smithsonian grounds when the park was first occupied, were replaced by nine new inclosures for strictly outdoor animals, especially for the medium-sized carnivores not requiring artificial heat. The new cages are made of iron framework, covered with heavy mesh wire, with cement floors, and comfortable, sanitary retiring rooms in the rear. The largest of these new cages, 20 by 20 by 12 feet in size, is now occupied by the Mexican pumas. The other eight, from 10 by 16 by 9 feet to 14 by 16 by 10 feet in size, are used for the snow leopard, lynxes, certain of the Canidæ, and a large chacma baboon. The type of construction adopted for these cages has proved exceedingly satisfactory, and the airy, cleanly quarters are much admired by the visitors.

The quarters occupied by the chimpanzee in summer having proved unsatisfactory since this animal became mature, it was decided to prepare outdoor cages for his use adjoining his winter home in the lion house. The hyena cage next to his indoor quarters was therefore remodeled and connected with his main apartment, and two spacious outdoor yards prepared for his use. He now has two comfortable indoor rooms and two outdoor yards, which makes the problem of his care much more simple, as it is not necessary with the new arrangement for his keepers to work while he is in the same room or outdoor cage.

Among minor improvements completed during the year are wide concrete steps connecting the walk in front of the bears with the walk on the lower level along the sea-lion and beaver pools; new drainage gutters at antelope house; new fence along hilltop below children's playgrounds and sand boxes near the Adams Mill entrance; and repairs to road between Klingle entrance and the upper ford. The reconstruction of the old outdoor chimpanzee cage into quarters suitable for a grizzly bear and the re-covering of the large outdoor cage for the California condors were both well under way, and would have been completed before the close of the fiscal year but for the fact that the cement and wire needed in the work could not, at that time, be obtained in Washington.

Alteration of the western boundary.—This item has been considered in the annual report for many years, and it is therefore especially gratifying now to be able to report actual progress on the purchase of the land necessary to protect the western entrance. The sundry civil act for 1921, approved during the past year, carries an appropriation of $80,000 for the purchase of all the land between the western boundary of the park and the unnamed street connecting Cathedral Avenue with Klingle Road, excepting one small lot at the southern end, together with 300 feet each side of Jewett Street fronting on Connecticut Avenue. All of Jewett Street, which now connects the park with Connecticut Avenue, and the included portion of the unnamed street running parallel with Connecticut Avenue are to become a part of the National Zoological Park, and a 50-foot roadway at each end of the area to be purchased will be taken over by the District of Columbia to connect the unnamed street with Connecticut Avenue. The area appropriated for includes 209,050.5 square feet, and the park will now be bounded at this point by public highways instead of privately owned property. The frontage on Connecticut Avenue, including the former Jewett Street, will be 625 feet—ample for all purposes.

IMPORTANT NEEDS.

Restaurant.—As mentioned in the last annual report one of the most urgent needs of the park is a suitable public restaurant. The present refreshment stand, entirely inadequate and in a bad state of repair, is unsuited to the present-day crowds of visitors. It is believed that an up-to-date building on the present site, 50 by 100 feet in size, and of two floors, one opening onto the lower slope to the west, would meet the requirements and would pay the Government a fair income in rent. Preliminary plans for such a building have been made by the office of the municipal architect; the present estimated cost of construction is $65,400.

Alteration of the southeastern boundary.—The District government has now opened Adams Mill Road from the southeastern entrance of the National Zoological Park to Harvard Street and a narrow strip of land, between the park and this new roadway, between Clydesdale Place and Ontario Road, still in private ownership, should become Government property. This narrow strip of land is of very little use, except possibly for garages, and its close proximity to the entrance to the park makes its public ownership of great importance. The amount required for its purchase is comparatively small and its acquisition by the park or by the District of Columbia should not long be delayed. The cost should not exceed $4,000.

Outdoor quarters for mammals.—Provision should be made for the exhibition of lions, Siberian tigers, and other mammals now occupying quarters in certain buildings, in outdoor inclosures with warm but unheated shelters. The animals themselves would be greatly improved by such conditions and the space they now occupy in buildings would become available for animals actually requiring heated quarters in winter. It is proposed that, when funds may be obtained for the purpose, large inclosures of this type be constructed on the space between the lion house and the monkey house now utilized as a paddock for ostriches.

The most urgent need of the park at the present time is increased compensation for certain of the employees, particularly the keepers and policemen. While the rate of pay for these and other employees has been slightly increased during the past four years, the increase has in no measure kept pace with the cost of living, and it is becoming more difficult all the time to retain valuable and trained men in the service.

Respectfully submitted.

N. Hollister, *Superintendent.*

Dr. Charles D. Walcott,
Secretary, Smithsonian Institution, Washington, D. C.

APPENDIX 5.

REPORT ON THE ASTROPHYSICAL OBSERVATORY.

SIR: The Astrophysical Observatory was conducted under the following passage of the sundry civil act approved July 19, 1919:

> Astrophysical Observatory: For maintenance of Astrophysical Observatory, under the direction of the Smithsonian Institution, including assistants, purchase of necessary books and periodicals, apparatus, making necessary observations in high altitudes, repairs and alterations of buildings, and miscellaneous expenses, $13,000.

The observatory occupies a number of frame structures within an inclosure of about 16,000 square feet south of the Smithsonian administration building at Washington, and also a cement observing station and frame cottage for observers on a plot of 10,000 square feet leased from the Carnegie Solar Observatory, on Mount Wilson, Calif.

The present value of the buildings and equipment is estimated at $50,000. This estimate contemplates the cost required to replace the outfit for the purpose of the investigation.

WORK OF THE YEAR.

At Washington.—Much labor was expended on the preparation of tables of results for publication in Volume IV of the Annals of the Observatory.

Under Mr. Fowle's direction, the Mount Wilson observations of 1919 were reduced and compared with those obtained by Smithsonian observers in Chile. An experiment had been made in using rolled stellite instead of cast stellite to prepare new spectroscope mirrors for the South American work. As these mirrors were not quite finished when Director Abbot went south to observe the eclipse of May 28 (as related in last year's report) he took with him the Mount Wilson spectroscope mirrors, intending that the new ones should replace them on Mount Wilson. Unfortunately, they proved unsuitable owing to a gradual alteration of figure after completion, but were nevertheless used on Mount Wilson by Mr. Aldrich for the experiments of 1919.

The matter is mentioned here because the defective mirrors introduced stray light in the spectrum, which led to a systematic error of 2 per cent (in defect) in the Mount Wilson solar constant values of 1919. Considerable additional labor was required in the reductions on this account. Furthermore, the sky was unusually hazy and streaky on Mount Wilson in 1919, which also added to the labor and anxiety of determining the best values from the observations.

Agreement of Mount Wilson and Chilean work.—However, the results when finally worked out proved to agree excellently, except for the systematic error above mentioned, with the results obtained in Chile. Both stations showed simultaneous and nearly equal fluctuations of solar radiation through a range of about 5 per cent. After allowing for the aforesaid 2 per cent systematic error of Mount Wilson, the average deviation of the two stations was but 0.013 calorie, or 0.65 per cent from all the values, about 50 in number, obtained on corresponding days. Omitting five values very discordant, when the Mount Wilson sky was very hazy and streaky, the average deviation of the remaining days was about 0.008 calorie, or 0.4 per cent.

Solar variation confirmed by observations of Saturn.—From correspondence with Dr. Guthnick, of the Berlin-Babelsberg Observatory, a most interesting confirmation of the solar variability has appeared. Variations of brightness of the planet Saturn from January to May, 1920, were shown by Dr. Guthnick's photo-electric observations which could not be accounted for after allowance for all known sources of variability. These outstanding variations were found to be in almost exact correlation with fluctuations of the solar radiation as observed at Calama, Chile. One per cent increase in solar radiation was found to accompany 1 per cent increase of Saturn's brightness.

These results, however, were only derived in connection with one of two possible interpretations of the nature of solar variation. The sun might vary in such a manner that its changes would be observed simultaneously in all directions and so would occur on identical days on all the planets. This hypothesis *does not fit* the available observations of the sun and Saturn. On the other hand, the solar radiation may be unequal in different directions. Such inequalities are, in fact, indicated by the ragged raylike structure of the solar corona. On this hypothesis a change of solar radiation would occur as ray after ray strikes the earth in the course of the sun's rotation upon its axis. These same unequally intense rays would reach the planet Saturn either before or after they reached the earth, according to the relative heliocentric longitudes of the earth and Saturn. The sun rotates about 14° a day, so that the angular difference in position of the two planets is to be divided by 14° to indicate the number of days allowance to be made between the dates of corresponding solar and Saturnian measurements.

Proceeding on this second hypothesis, extraordinarily close correspondence between the variations of the sun and Saturn was found. Further work of the kind is to be done at Saturn's next opposition. It will be noted that this second hypothesis of the nature of the solar variation relieves us of the great difficulty of understanding how so immense a body as the sun could vary in radiation so rapidly as our observations indicate. We have now only to suppose that there are inequalities of radiation in different directions which may be due to the absorption or scattering of the rays in the coronal regions near the sun. These inequalities may persist with little alteration for weeks. We, however, note them as variations of solar radiation as they sweep by us in the course of the sun's rotation on its axis.

The honeycomb pyranometer.—Mr. Aldrich constructed two copies of a new instrument devised by Abbot and Aldrich for measuring "nocturnal radiation." We call it provisionally the "honeycomb pyranometer." In this instrument a long thin ribbon of "therlo" resistance metal about one-half inch wide and one one-thousandth of an inch thick is bent in such a way as to make up into 200 cells of triangular cross section all included in a total cross-sectional area of about 1 inch square. The corners of the cells are electrically insulated with baked shellac so that a current of electricity can be caused to flow from end to end of the ribbon and thus all around each cell. Radiation which enters the front of the cells from any source, if not absorbed there is reflected to and fro within the cells till it reaches their rear ends. There its remnant emerges upon a silvered mirror inclined at a small angle so as to throw back the rays to make a second course to and fro toward the front. Thus by repeated absorptions the rays are at length almost wholly converted into heat. The device is, in short, a "black body." But unlike other "black-body" receivers, its central cells are protected from losses of heat to the sides by reason of the nearly equally warmed cells surrounding them. Thus the instrument is almost as sensitive as a flat blackened strip, but possesses the valuable property of being fully absorbing, which a strip does not. The temperature difference between the central cells and the case of the instrument is indicated by thermoelectric elements. By passing a proper electric current through the "therlo" ribbon the same temperature difference can be produced as by radiation. The known energy of the electric current becomes the desired measure of the energy of radiation, as in Ångstrom's pyrheliometer. Also the constant of the apparatus is calculable from the known dimensions of it. It is possible, too, to observe the solar radiation with this instrument, and so to calibrate it. Measurements of this kind check very closely with the computed values.

Messrs. Aldrich and Abbot made a series of measurements with the honeycomb pyranometer on various sources of radiation, including comparisons with the ordinary pyranometer on incandescent lamps of different kinds, and also observations on large hollow radiators at different constant temperatures. Values of the constant of the fourth power law of radiation differing by only 1 per cent from the best accepted value were readily obtained in this latter work.

n the whole the "honeycomb pyranometer" is an instrument of eat promise for standard measurements.

Experiments on the constant "sigma."—In collaboration with Dr. E. Mendenhall, a new attempt was begun to devise means to easure the constant of radiation with greater certainty. Apparatus as devised and constructed in the Observatory shop for this pur- se. There was not time to try it before the departure of Messrs. bbot and Aldrich into the field, so that the apparatus was loaned to r. Mendenhall for trial at the University of Wisconsin.

Field work at Mount Wilson.—Mr. Aldrich continued observing on ount Wilson until October, 1919. As said above, the year was un- vorable both by reason of a defect in equipment and by reason of uch haze, cirrus cloud, and streakiness of sky. Also on many days curious wandering of the galvanometer needle occurred. This enomenon has been noted at Mount Wilson occasionally in former ars, but was unusually pronounced in 1919. By anticipation, it ay be remarked that it occurred also very markedly in late July d in August, 1920. The march of the galvanometer spot in these anderings is relatively slow. A centimeter or two back and forth on the scale in one to two minutes is the usual magnitude. It curs with the galvanometer unconnected to the bolometer. Reasta- cising of the needle system till it turned in the earth's field at the me rate as the supporting quartz fiber failed to cure the trouble. he Mount Wilson expedition was renewed in June, 1920, by Messrs. bbot and Aldrich.

Proposed station in Arizona.—The prevailing cirrus cloudiness d haziness at Mount Wilson in all recent years, greatly exceed- g that which obtained from 1905 to 1910, when the station was new, s been very discouraging. Furthermore, the station is quite un- itable for "solar-constant" work in winter and spring months ving to cloudiness. It is urgently desirable to observe the solar diation daily, as far as possible, in the United States, in order to eck the results which are being obtained by Smithsonian observers Chile.

Accordingly it seemed best to set up a station in the most cloud- ss region of the United States, where the work could go on during e entire year. Chief Marvin, of the Weather Bureau, obligingly used investigations to be made of various proposed sites in Cali- rnia, Nevada, and Arizona. The one of highest promise appeared be on the Harqua Hala Mountain (elevation about 5,800 feet) near enden, Ariz. Congress was urged to appropriate $25,000 for the tablishment of a first-rate "solar-constant" observing station at e best site, but the appropriation failed.

At this juncture Messrs. Abbot and Marvin held a long discussion correspondence and verbally as to the reality of the supposed solar variability, and its availability as a forecasting element, in view of the use being made of the Smithsonian solar observations in Chile by the Argentine and Brazilian weather bureaus. The discussion brought out very clearly the urgency of obtaining corroborative observations of the solar radiation daily in the United States.

Fortunately the proposed new station obtained private financial support in the lack of congressional action. Mr. John A. Roebling, of Bernardsville, N. J., at Dr. Abbot's solicitation, made a grant of $11,000 for promoting measurements of solar radiation. Mr. Roebling made the condition that so much of this sum as necessary should be devoted to removing the Smithsonian station from the plain near Calama, Chile, to a mountain site above the reach of dust and smoke. Any balance remaining after this improvement of the Chilean station could be used for the removal of the Mount Wilson equipment to the Harqua Hala Mountain in Arizona, or for such other purpose as Dr. Abbot might prefer for the advance of the study of solar radiation.

At a cost of between $4,000 and $5,000 the Calama station was removed to a mountain about 10 miles south of Calama, where skies of extraordinary purity have been experienced. The removal was completed and first observations made at the mountain shortly after the close of the fiscal year.

Dr. Abbot visited Wenden, Ariz., and the Harqua Hala Mountain in the last week of June, 1920. Contracts were made for the erection on the summit of a stone and adobe building of two stories, a lower, partly underground, for observing, and an upper for quarters of observers. This is to be ready for occupancy by September 15, 1920, when it is proposed to remove the "solar-constant" observing equipment from Mount Wilson to Harqua Hala.

The purpose of these improvements is to enable us to obtain nearly every day in the year first-rate check observations of the "solar constant" of radiation at two stations remote from one another in the two hemispheres. Only thus is it possible to lay a firm foundation of solar observations extending over a considerable interval of time, which will enable meteorologists to determine if the sun's variations are really of value as a weather-forecasting element. In view of the results published by Mr. H. H. Clayton, of the Argentine weather service, there is sufficient evidence that this may be the case to warrant the expense and discomfort attending the continuous occupation of two desert mountain observatories like Harqua Hala and the Chilean station.

Great appreciation is due Mr. John A. Roebling for his generous aid in stepping into the breach at this time when it proved impossible to obtain public support for the urgent need. Only the most primitive equipment has, it is true, been possible on the Harqua Hala Mountain with the means available. Unfortunately, too, it means a considerable restriction of other interesting investigations under way or proposed, owing to the partial dismantling of the Mount Wilson station. This is greatly to be regretted. It is recommended that Congress be urged to appropriate the money needed to complete the independent equipment of Harqua Hala, so as to permit needed apparatus to return to Mount Wilson. The Harqua Hala station should also be relieved of its limitations of water, of accessibility, and of communication, and the buildings made more commodious. Otherwise it will be only at such personal sacrifice of comfort as few can be found willing to make that its work can go on.

PERSONNEL.

Miss Inez Ensign resigned as computer on September 22, 1919. Miss F. A. Graves returned as computer from leave for overseas work in France on September 4, 1919. Miss Gladys Thurlby, computer, married, on May 8, 1919, Mr. Albion M. Bond, but remained in the service of the Observatory.

SUMMARY.

The year has been marked by the practical completion for publication of Volume IV of the Annals, but no appropriation is yet available for its publication. Close agreement in solar variation was found for 1918 and 1919 between results of Mount Wilson, Calif., and Calama, Chile, 4,000 miles apart. A further remarkable confirmation of the solar variation comes from a comparison of Smithsonian observations in Chile with photo-electric observations of the brightness of Saturn by Dr. Guthnick, of the Berlin-Babelsberg Observatory. This comparison indicates that the nature of the rapid solar variation consists in the rotation with the sun of rays of unequal brightness which strike the different planets successively in the order of their longitudes and fall one after the other upon the earth as the sun by rotation brings them into line with us. A new nocturnal radiation instrument, provisionally called the "honeycomb pyranometer" on account of its cellular structure, and which employs the well-known hollow chamber principle of the "absolutely black" body, but without loss of sensitiveness, has been successfully constructed and tried. By the generosity of Mr. John A. Roebling, of New Jersey, it has been possible to remove the Chile station to a mountain above the dust and smoke of its former plateau location, and also to erect a building on the Harqua Hala Mountain, in Arizona, to which the Mount Wilson solar-constant work will be removed in September, 1920.

Respectfully submitted.

C. G. Abbot, *Director.*

Dr. C. D. Walcott,
Secretary, Smithsonian Institution.

APPENDIX 6.

REPORT ON THE INTERNATIONAL CATALOGUE OF SCIENTIFIC LITERATURE.

SIR: I have the honor to submit the following report on the operations of the United States Bureau of the International Catalogue of Scientific Literature for the fiscal year ending June 30, 1920.

At the beginning of the war six volumes of the eleventh issue were still to be published, and only one volume of the twelfth issue had appeared.

In spite of the evident financial difficulty ahead of the Catalogue, the Royal Society decided that publication should be continued through the fourteenth issue, covering the year 1914. The deficit has since been met by generous contributions from the Royal Society, the Carnegie Corporation of New York, and other sources. All of the volumes of the thirteenth and fourteenth issues have now been published excepting those for Geology and Physiology of the fourteenth issue, which are both in advanced stages of preparation. Much of the material for the fifteenth and later issues is now in the hands of the Central Bureau awaiting only authority for its publication.

On account of the general upheaval felt among all international organizations as soon as war began, it became impossible for the International Catalogue to continue its work in the satisfactory manner which up to that time had characterized the enterprise. A brief review of the history and aims of the International organization may be repeated in order that the future aims and plans may be better understood.

When the publication was begun in 1901 it was for the purpose of satisfying a recognized demand for a complete authors' and subject index of all current scientific literature. This demand was to be met by publishing in annual volumes, one for each recognized branch of pure science, a complete authors' and subject index to its current literature. Each branch of science was to be covered by volumes containing complete citations of the author, title and source of every original paper, comprising first an authors' index and second a classified subject index so arranged by means of classification schedules that the literature on any subject in any of the sciences might be readily found. The schedules were issued prior to the publication of the first volumes of the Catalogue and were prepared in every case by specialists who were careful to take into consideration the needs of scientists as well as of librarians and students. Provision was made to include new subjects and introduce new methods of reference as the demand arose, in recognition of the fact that practically all of the sciences are in a constant state of transition and that a plan satisfactory at one time would probably be inadequate to meet the needs of a later period.

Omitting the greater part of the intervening history of the work, it may be said that in 1910, at a conference held in London to discuss the affairs of the Catalogue, it was recognized that although changes had been made in many of the schedules a general revision was necessary and a committee was appointed to superintend this revision. Authority was given to this committee by a resolution which reads as follows:

> That a committee be appointed to revise the schedules and to make such other alterations as may be necessary in the form of issue of the Catalogue. That it may be an instruction to the committee that, so far as possible, the subject index be confined to abbreviated titles and authors' names and numbers to serve as references to the authors' index.

It will thus be seen that plans were in preparation to greatly increase the usefulness of the Catalogue, but before they were put into effect the war came and all progress was necessarily checked, and although the war is now over, financial conditions still prevent the introduction of new and improved methods. In spite of the fact that the publication of the Catalogue was begun under financial difficulties, as no working capital was available, by 1914, when the war began, the receipts and expenditures practically balanced.

The delay in the publication of the annual volumes is recognized as the most serious defect in the enterprise, but with this remedied, as it would have been, but for the war, and with the schedule revision in effect as provided for in the resolution above quoted, it is undoubtedly true that the International Catalogue would now meet all practical requirements of an annual authors' and subject catalogue to the literature of pure science.

A résumé of the condition of the work at present can not better be given than by quoting a statement made by Prof. Henry E. Armstrong, who as dean of the enterprise and chairman of its executive committee, is of all persons connected with the Catalogue the one best fitted to report on its affairs.

> The progress made in the publication of the International Catalogue since its foundation in 1900 is nothing short of remarkable. Two hundred and forty-two volumes have been published, indexing the scientific literature of the period 1901-1914. An extraordinarily broad, sound foundation has been laid and much helpful experience gained. The difficulties that were expected to arise

have either been nonexistent or were easily overcome. To have established so complete an organization on a thoroughly successful working basis is in itself a feat of no mean order and most creditable to all concerned, not only to the staff of the Central Bureau but also to the various regional bureaus.

The real difficulty by which the work has always been hampered is want of a working capital; this has affected both the Central and the regional bureaus. Had funds been always available, publication would have been far more rapid and the work might have been more fully developed. Almost every criticism that has been leveled at the Catalogue involves its extension, and therefore additional expenditure.

The International Catalogue was established primarily to meet the demands of scientific workers by furnishing an annual authors' and subject catalogue and index to the literature of each of the recognized branches of science; but as it is now evident that a general revision of the methods of production will be necessary, as soon as international affairs become stabilized, it would appear advisable when this revision becomes operative to establish some form of cooperation with the many existing abstract journals and, so far as possible, to encourage and aid the establishment of abstract journals in sciences not already represented. This need for abstract journals is now pressing for recognition, especially in the United States, and the preparation and publication of abstracts is so akin to that of scientific yearbooks that economy of effort in the production of both branches of bibliography evidently demands a very close cooperation. These abstract journals, organized and directed by workers in the several sciences represented, would, when published, form the basis of the annual volumes of an authors' and subject index similar to the present International Catalogue of Scientific Literature, preferably by the reorganization of that international project which already receives official recognition and support from practically all of the countries of the world, acting through some 30 regional bureaus.

By some simply organized method of cooperation between the abstract journals and the Catalogue, both branches would mutually aid one another to a very great extent and would in practice act as one organization. The abstracts and citations published in the abstract journals would form the basis of the Catalogue, thereby greatly simplifying the work of the regional bureaus, which in turn would aid the abstract journals in many ways and relieve them of the necessity of publishing annual indexes, at present quite an expensive and laborious undertaking. The abstract journals and annual indexes would together furnish to scientific investigators, librarians, and others interested in scientific subjects all that they severally require.

Owing to the financial difficulty which has involved the International Catalogue since war began, the Royal Society, which since the beginning of the undertaking has been the financial sponsor of the Catalogue, has issued invitations to scientific academies and institutions to send delegates to a special conference to open on September 28, 1920, in London to discuss the future of the International Catalogue. As the need for a catalogue of scientific literature is universally acknowledged, and as the present organization of the International Catalogue up to the time of the beginning of the war was meeting this demand in a more satisfactory manner than ever before, and as the present organization has behind it the official support of all of the principal countries of the world, it appears obvious that every effort should be made to continue and improve the work rather than abandon it simply on account of temporary financial troubles and later have to reestablish the organization to cover the same ground. Many projects are now being promoted to publish abstracts, indexes, and catalogues of scientific publications, but the question of finance seems to be a common paramount difficulty, and it will certainly require less money to assure the success of the present organization than it would to organize and finance a new project.

Very respectfully, yours,

LEONARD C. GUNNELL,
Assistant in Charge.

Dr. CHARLES D. WALCOTT,
Secretary, Smithsonian Institution.

APPENDIX 7.

REPORT ON THE LIBRARY.

SIR: I have the honor to submit the following report on the activities of the library of the Smithsonian Institution during the fiscal year ended June 30, 1920:

The receipts of publications compare most favorably with those of preceding years. Packages withheld from the mails during the war have begun to come in, and war regulations limiting exchanges have been largely removed. Although many societies were forced to limit distribution or to suspend publication during the war, it is expected that the receipts will continue to increase when shipments through the international exchanges may again be made between the United States and the Central Powers. The receipts for the year ended were 23,810 packages, 22,495 of which were received by mail and 1,315 through the international exchanges. Eight hundred and eighty volumes were completed and 14,273 entries were made.

The library has suffered, however, from a lack of cataloguers to carry on the work. The question of salaries for cataloguers in the library is a serious one, as those doing similar work elsewhere are receiving at least 33 per cent more. One desk has been vacant for practically the entire year and, as the staff already was very small, this has been a serious handicap.

SMITHSONIAN MAIN LIBRARY.

Publications for the Main Library, after entry on the records, are forwarded to the Library of Congress for deposit in the Smithsonian Division. The accession numbers for the year extended from 532,003 to 534,618, the accessions including 3,634 volumes, 186 parts, 157 pamphlets, and 42 charts.

The cataloguing covered 23,332 volumes and 32 charts; 848 volumes were recatalogued; 2,280 cards were typewritten and 618 cards from the Library of Congress, for publications deposited there by the Institution, were filed in the catalogue; 3,756 public documents were presented to the Library of Congress in accordance with the established practice.

Dissertations were received from the Universities of Toulouse, Paris, Utrecht, Lund, Ghent, Helsingfors, Bonn, Basel, Lausanne, Zurich, and Geneva.

The securing of publications in exchange for the completion of sets has been continued with the following results:

Number of want cards received from Library of Congress:	
From Smithsonian Division	176
From Periodical Division	79
From Order Division	30
Total	285

Number of publications secured for Library of Congress:	Vols.	Parts.
For Smithsonian Division	313	316
For Periodical Division	11	66
For Order Division	13	36
Total	337	418

Number of sets completed, 73.

With exchanges to the Central Powers still suspended, shipments delayed, and many societies suspending publication, the time for securing missing parts has been far from favorable. It is worthy of note, however, that in spite of the unfavorable conditions, a larger proportion of the wants have been secured in exchange than in years previous as may be seen by the following table:

Years.	Want cards received.	Sets completed.	Per cent.
1915–16	387	82	21.0
1917–18	996	186	18.6
1919–20	514	134	26.0

Requests sent out for missing parts, it will be seen, are more effective by 5 per cent than those sent out before the war. It is hoped that, when shipments to the Central Powers through the International Exchange Service are resumed, and overseas shipments can be delivered more promptly, that still better results can be secured.

SMITHSONIAN OFFICE LIBRARY.

The accessions for the office library amounted to 300 volumes and 7 pamphlets, not including the set of publications of the Carnegie Institution of Washington, numbering more than 300 volumes, which has been placed on deposit by Secretary Walcott. In order to provide adequate shelving space for these volumes it was necessary to rearrange the books already in the reference room, and as a result, practically all of the shelving space is now occupied. The circulation of books in the reference room was 218 volumes.

Aeronautical collection.—The aeronautical collection, as in the past, has been consulted by students of aeronautics of foreign countries as well as those of the United States. Additional cases in the hall of the Smithsonian Institution have been set aside for the accommodation of this collection, so that it is now more accessible to the public. Forty new titles were added during the year.

De Peyster collection.—Author cards for the Napoleon series, numbering more than 1,200 volumes, have been made, and the books have been arranged in regular order in the cases in the hall of the Smithsonian Institution. Author cards have been made also for the series in British, German, and Italian history.

Reading room.—The number of magazines loaned during the year from the reading room was 2,907, a decrease of 233, as compared with the preceding year. The service has suffered from the fact that no binding could be done, owing to the exhaustion of the funds available for this purpose.

Employees' library.—The increased use of the employees' library is noteworthy. Six hundred and forty-one volumes were loaned, as compared with 332 last year.

MUSEUM LIBRARY.

There have been no additions to the Museum library of exceptional importance. Valuable material has been contributed, however, by Dr. Charles D. Walcott, Mr. W. R. Maxon, Maj. Gen. John R. Brooke, Dr. A. J. Boving, Dr. F. H. Knowlton, Dr. J. M. Aldrich, Dr. W. H. Holmes, Dr. Mary J. Rathbun, Dr. W. H. Dall, Dr. O. P. Hay, Mr. William Schaus, Dr. C. W. Richmond, Mr. Austin H. Clark, Dr. Walter Hough, Mr. A. N. Caudell, and the Knab estate.

Accessions.—Two thousand five hundred and forty-eight accessions were received during the year, including 1,932 completed volumes and 1,581 pamphlets. The number of books in the library is now 145,307; including 56,617 volumes and 88,690 parts of volumes and pamphlets.

Periodicals.—Thirteen thousand four hundred and thirty-two periodicals were entered during the year; 2,619 section cards for periodicals and 858 section cards for volumes were made. The number of new cards for periodicals was 351.

Cataloguing.—The number of catalogue cards added was 2,748; 744 books and 1,529 pamphlets were catalogued.

Loans.—The number of books loaned out was 9,802. Of these, 2,145 books, including 1,951 from the Library of Congress, were borrowed from other libraries. Fully as many volumes were consulted, but were not taken out.

Binding.—Owing to the increasing cost of binding, the library's funds allotted for that purpose were exhausted in January, 1920.

As will be seen by the figures below, the library's allotment for binding has not kept pace with the increases in cost. As a consequence the number of books sent to the Government bindery has been steadily decreasing. Following are the number sent during the past three fiscal years:

1918	1,706
1919	1,322
1920	737

With a constantly increasing supply of volumes and many publications received during the present and past fiscal years still unbound, the library is greatly handicapped and is unable to render the service that it should.

Technological series.—Additions to the technological library during the year, exclusive of duplicates, number 200 bound volumes, 2,983 pamphlets, and 2,576 periodicals; 2,245 cards have been added to the scientific depository catalogue. A special effort has been made to complete the files of publications, especially United States Government documents. The books and periodicals loaned during the year were 200.

Sectional libraries.—Following is a complete list of sectional libraries:

Administration.
Administrative assistant's office.
Anthropology.
Biology.
Birds.
Botany.
Comparative anatomy.
Editor's office.
Ethnology.
Invertebrate paleontology.
Mammals.
Marine invertebrates.
Materia medica.
Mechanical technology.
Mesozoic fossils.
Minerals.
Physical anthropology.
Prehistoric archeology.
Property clerk.
Registrar's office.
Reptiles and batrachians.
Superintendent's office.

BUREAU OF AMERICAN ETHNOLOGY LIBRARY.

A report of the operations of the library of the Bureau of American Ethnology will be found in the report of that bureau. This library is administered under the direct care of the chief of the bureau.

ASTROPHYSICAL OBSERVATORY LIBRARY.

Further additions to the library of the Astrophysical Observatory number 87 volumes, 10 parts of volumes, and 16 pamphlets.

NATIONAL ZOOLOGICAL PARK LIBRARY.

To the National Zoological Park library there were added six volumes and two pamphlets.

SUMMARY OF ACCESSIONS.

The accessions during the year, with the exception of those in the library of the Bureau of American Ethnology, may be summarized as follows:

To the Smithsonian deposit in the Library of Congress, including parts to complete sets	4,019
To the Smithsonian office, Astrophysical Observatory, and National Zoological Park libraries	428
To the United States National Museum library	2,548
Total	6,995

Respectfully submitted.

Paul Brockett,
Assistant Librarian.

Dr. Charles D. Walcott,
Secretary, Smithsonian Institution.

APPENDIX 8.

REPORT ON THE PUBLICATIONS.

SIR: I have the honor to submit the following report on the publications of the Smithsonian Institution and its branches during the year ending June 30, 1920:

The Institution proper published during the year 14 papers in the series of Miscellaneous Collections, 1 annual report and pamphlet copies of 20 articles in the appendix to the report, and 1 special publication. The Bureau of Ethnology published 1 annual report and 3 separate papers from the same report, and 4 bulletins. The United States National Museum issued 1 annual report, 3 volumes of the proceedings, 33 separate papers forming parts of these and other volumes, 5 bulletins, and 9 separate parts of bulletins.

The total number of copies of publications distributed by the Institution and its branches was 143,290, which includes 157 volumes and separates of the Smithsonian Contributions to Knowledge, 24,949 volumes and separates of the Smithsonian Miscellaneous Collections, 16,720 volumes and separates of the Smithsonian annual reports, 81,936 volumes and separates of National Museum publications, 16,761 publications of the Bureau of American Ethnology, 1,958 special publications, 19 volumes of the Annals of the Astrophysical Observatory, 23 reports on the Harriman Alaska Expedition, and 564 reports of the American Historical Association.

SMITHSONIAN MISCELLANEOUS COLLECTIONS.

Of the Miscellaneous Collections, volume 67, 2 papers were issued; volume 69, 2 papers; volume 70, 3 papers; volume 71, 5 papers; volume 72, 2 papers; in all, 14 papers, as follows:

VOLUME 67.

No. 5. Cambrian Geology and Paleontology. IV, No. 5. Middle Cambrian Algae. By Charles D. Walcott. December 26, 1919. Pp. 217–260, pls. 43–59. (Publ. 2542.)

No. 6. Cambrian Geology and Paleontology. IV, No. 6. Middle Cambrian Spongiae. By Charles D. Walcott. April 21, 1920. Pp. 261–364, pls. 60–90. (Publ. 2580.)

VOLUME 69.

No. 1. Smithsonian Meteorological Tables. August 19, 1919. 261 pp. (Publ. 2493.)

No. 5. Mammals of Panama. By Edward A. Goldman. April 22, 1920. 309 pp., 39 pls. (Publ. 2498.)

VOLUME 70.

No. 2. Explorations and field-work of the Smithsonian Institution in 1918. July 15, 1919. 122 pp., 127 figs. (Publ. 2535.)

No. 3. Archeological investigations at Paragonah, Utah. By Neil M. Judd. July 15, 1919. 22 pp., 15 pls. (Publ. 2536.)

No. 4. Temperature variations in the North Atlantic Ocean and in the atmosphere. Introductory studies on the cause of climatological variations. By Björn Helland-Hansen and Fridtjof Nansen. Hodgkins Fund. April 17, 1920. 408 pp., 48 pls. (Publ. 2537.)

VOLUME 71.

No. 2. A method of reaching extreme altitudes. By Robert H. Goddard. December 30, 1919. 69 pp., 10 pls. (Publ. 2540.)

No. 3. Variation in solar radiation and the weather. By H. Helm Clayton (introductory note by C. G. Abbot.) January 15, 1920. 53 pp., 5 pls. (Publ. 2544.)

No. 4. The brightness of the sky. By A. F. Moore and L. H. Abbot. Hodgkins Fund. February 4, 1920. 36 pp. (Publ. 2545.)

No. 5. Observations of the total solar eclipse of May 29, 1919. By C. G. Abbot and A. F. Moore. January 31, 1920. 12 pp., 1 pl. (Publ. 2578.)

No. 6. New species of piper from Panama. By Casimir de Candolle. February 12, 1920. 17 pp. (Publ. 2579.)

VOLUME 72.

No. 1. Explorations and field-work of the Smithsonian Institution in 1919. May 8, 1920. 80 pp., 77 figs. (Publ. 2581.)

No. 2. Two new East African primates. By N. Hollister. January 22, 1920. 2 pp. (Publ. 2582.)

SMITHSONIAN ANNUAL REPORTS.

REPORT FOR 1917.

The complete volume of the Annual Report of the Board of Regents for 1917, together with pamphlet copies of the papers in the general appendix, was received from the Public Printer during the year.

Annual Report of the Board of Regents of the Smithsonian Institution, showing operations, expenditures, and condition of the Institution for the year ending June 30, 1917. xii+674 pp., 241 pls. (Publ. 2502.)

The appendix contained the following papers:

Projectiles containing explosives, by Commandant A. R. 16 pp. (Publ. 2503.)

Gold and silver deposits in North and South America, by Waldemar Lindgren. 27 pp. (Publ. 2504.)

The composition and structure of meteorites compared with that of terrestrial rocks, by George P. Merrill. 14 pp., 9 pls. (Publ. 2505.)

Corals and the formation of coral reefs, by Thomas Wayland Vaughan. 88 pp., 37 pls. (Publ. 2506.)

The correlation of the quaternary deposits of the British Isles with those of the continent of Europe, by Charles E. P. Brooks. 99 pp. (Publ. 2507.)

Natural history of Paradise Key and the near-by everglades of Florida, by W. E. Safford. 58 pp., 64 pls. (Publ. 2508.)

Notes on the early history of the pecan in America, by Rodney H. True. 14 pp. (Publ. 2509.)

Floral aspects of the Hawaiian Islands, by A. S. Hitchcock. 14 pp., 25 pls. (Publ. 2510.)

The social, educational, and scientific value of botanic gardens, by John Merle Coulter. 6 pp. (Publ. 2511.)

Bird rookeries of the Tortugas, by Paul Bartsch. 32 pp., 38 pls. (Publ. 2512.)

Catalepsy in Phasmidae, by P. Schmidt. 5 pp. (Publ. 2513.)

An economic consideration of orthoptera directly affecting man, by A. N. Caudell. 8 pp. (Publ. 2514.)

An outline of the relations of animals to their inland environments, by Charles C. Adams. 28 pp. (Publ. 2515.)

The National Zoological Park—A popular account of its collections, by N. Hollister. 51 pp., 46 pls. (Publ. 2516.)

The sea as a conservator of wastes and a reservoir of food, by H. F. Moore. 14 pp., 8 pls. (Publ. 2517.)

Ojibway habitations and other structures, by David I. Bushnell, jr. 9 pp., 6 pls. (Publ. 2518.)

National work at the British Museum—Museums and advancement of learning, by F. A. Bather. 15 pp. (Publ. 2519.)

Leonhard Fuchs, physician and botanist, 1501–1566, by Felix Neumann. 13 pp., 7 pls. (Publ. 2520.)

In memoriam—Edgar Alexander Mearns, 1856–1916, by Charles W. Richmond. 14 pp., 1 pl. (Publ. 2521.)

William Bullock Clark. 4 pp. (Publ. 2522.)

REPORT FOR 1918.

The general appendix to the report for 1918, which was still in press at the close of the year, contains the following papers:

1. The discovery of helium, and what came of it, by C. G. Abbot.
2. An account of the rise of navigation, by R. H. Curtiss.
3. The tornadoes of the United States, by Robert DeC. Ward.
4. Wind power, by James Carlill.
5. A tribute. Samuel Pierpont Langley: Pioneer in practical aviation, by Henry Leffmann.
6. Modern physics, by R. A. Millikan.
7. The experiments of Dr. P. W. Bridgman on the properties of matter when under high pressure. Introductory note by C. G. Abbot.
8. The problem of radioactive lead, by Theodore W. Richards.
9. Sphagnum moss; war substitute for cotton in absorbent surgical dressings, by George E. Nichols.
10. History of military medicine and its contributions to science, by Col. W. P. Chamberlain.

11. Some problems of international readjustment of mineral supplies as indicated in recent foreign literature, by Eleanora F. Bliss.
12. Reptile reconstructions in the United States National Museum, by Charles W. Gilmore.
13. A pleistocene cave deposit of western Maryland, by J. W. Gidley.
14. Paleobotany: A sketch of the origin and evolution of floras, by Edward W. Berry.
15. The direct action of environment and evolution, by Prince Kropotkin.
16. The law of irreversible evolution, by Branislav Petronievics.
17. The fundamental factor of insect evolution, by S. S. Chetverikov.
18. The psychic life of insects, by E. L. Bouvier.
19. Sexual selection and bird song, by Chauncey J. Hawkins.
20. Marine camoufleurs and their camouflage: The present and prospective significance of facts regarding coloration of tropical fishes, by W. H. Longley.
21. Foot-plow agriculture in Peru, by O. F. Cook.
22. Sun worship of the Hopi Indians, by J. Walter Fewkes.
23. The League of the Iroquois and its constitution: A constitutional league of peace in the Stone Age of America, by J. N. B. Hewitt.
24. The problem of degeneracy, by H. F. Tredgold.
25. History in tools, by W. M. Flinders Petrie.
26. The background of Totemism, by E. Washburn Hopkins.
27. A great naturalist: Sir Joseph Hooker, by Sir E. Ray Lankester.

REPORT FOR 1919.

The report of the executive committee and proceedings of the Board of Regents of the Institution and report of the Secretary, both forming part of the annual report of the Board of Regents to Congress, were issued in pamphlet form in November, 1919.

Report of the executive committee and proceedings of the Board of Regents of the Smithsonian Institution for the year ending June 30, 1919. 18 pp. (Publ. 2548.)

Report of the Secretary of the Smithsonian Institution for the year ending June 30, 1919. 106 pp. (Publ. 2547.)

The general appendix to this report was in preparation but did not go to the printer until shortly after the close of the year.

SPECIAL PUBLICATIONS.

The following special publication was issued:

Publications of the Smithsonian Institution issued between October 16, 1918, and July 16, 1919. August 12, 1919. 1 p. (Publ. 2541.)

PUBLICATIONS OF THE UNITED STATES NATIONAL MUSEUM.

The publications of the National Museum are: (*a*) The annual report to Congress; (*b*) the Proceedings of the United States National Museum; and (*c*) the Bulletin of the United States National Museum, which includes the Contributions from the United States National Herbarium. The editorship of these publications is vested in Dr. Marcus Benjamin.

During the year ending June 30, 1920, the Museum published 1 nnual report, 3 volumes of the proceedings, 33 separate papers formıg parts of these and other volumes, 5 bulletins, and 9 separate parts f bulletins.

The issues of the proceedings were as follows: Volumes 54, 55, nd 56.

The issues of the bulletins were as follows:

Bulletin 103. Contributions to the geology and paleontology of the Canal Zone, anama, and geographically related areas in Central America and the West ıdies. Prepared under the direction of Thomas Wayland Vaughan.

Bulletin 106 (text). North American early Tertiary Bryozoa, by Ferdinand anu and Ray S. Bassler.

Bulletin 107. Life histories of North American diving birds. Order Pygopodes. y Arthur Cleveland Bent.

Bulletin 108. A revision of the nearctic termites, by Nathan Banks, with notes ı biology and geographic distribution, by Thomas E. Snyder.

Contributions from the United States National Herbarium, volume 21. Flora f the District of Columbia and vicinity, by A. S. Hitchcock and Paul C. tandley.

Of the separate papers of bulletins, the following were issued:

Bulletin 100. Contributions to the biology of the Philippine Archipelago and ljacent regions. Volume 1, part 6: The relationships of the genera Calırina, Tinoporus, and Baculogypsina as indicated by recent Philippine mateal, by Joseph A. Cushman. Volume 2, part 3: Pyrosoma—A taxonomic study ısed upon the collections of the United States Bureau of Fisheries and the nited States National Museum, by Maynard M. Metcalf and Hoyt S. Hopkins.

Bulletin 103. Contributions to the geology and paleontology of the Canal Zone, anama, and geologically related areas in Central America and the West ıdies. Pages 189–524: Fossil corals from Central America, Cuba, and Porto ica, with an account of the American Tertiary, Pleistocene, and recent coral efs, by Thomas Wayland Vaughan.

Of the remaining separates, 4 formed parts of volume 20 and 2 of volume , contributions from the United States National Herbarium, while 1 was om volume 55, 16 from volume 56, and 16 from volume 57 of the proceedings.

PUBLICATIONS OF THE BUREAU OF AMERICAN ETHNOLOGY.

The publications of the bureau are described in detail in Appendix of this report. The editorial work of the bureau is under the diction of Mr. Stanley Searles, editor.

During the past year four bulletins, the Thirty-third Annual Reprt, and three separates from this report were published, as follows:

Bulletin 60. Handbook of Aboriginal American Antiquities. By W. H. Holmes. 0 pp.

Bulletin 68. Structural and Lexical Comparison of the Tunica, Chitimacha, d Atakapa Languages. By John R. Swanton.

Bulletin 69. Native Villages and Village Sites East of the Mississippi. By ıvid I. Bushnell, jr. 111 pp., 17 pls.

Bulletin 70. Prehistoric Villages, Castles, and Towers. By J. Walter Fewkes. pp., 33 pls.

Thirty-third Annual Report—Accompanying Papers: (1) Uses of plants by e Indians of the Missouri River region (Gilmore); (2) Preliminary account of the antiquities of the region between the Mancos and La Plata Rivers in southwestern Colorado (Morris); (3) Designs on prehistoric Hopi pottery (Fewkes); (4) The Hawaiian romance of Laie-i-ka-wai (Beckwith). 677 pp., 95 pls.

Three separates from the thirty-third Annual Report.

There were in press at the close of the year five annual reports and nine bulletins. The bulletins were as follows:

Bulletin 67. Alsea Texts and Myths (Frachtenberg).

Bulletin 71. Native Cemeteries and Forms of Burial East of the Mississippi (Bushnell).

Bulletin 72. The Owl Sacred Pack of the Fox Indians (Michelson).

Bulletin 73. Early History of the Creek Indians and their Neighbors (Swanton).

Bulletin 74. Excavations at Santiago, Ahuitzotla, D. F. Mexico (Tozzer).

Bulletin —. Northern Ute Music (Densmore).

Bulletin —. Mandan and Hidatsa Music (Densmore).

Bulletin —. Handbook of the Indians of California (Kroeber).

Bulletin —. Archeological Investigations in the Ozark Region of Central Missouri (Fowke).

REPORT OF THE AMERICAN HISTORICAL ASSOCIATION.

The annual reports of the American Historical Association are transmitted by the association to the Secretary of the Smithsonian Institution, and are communicated to Congress under the provisions of the act of incorporation of the association.

Volume 2 of the report for 1916 was published during the year, and the reports for 1917 and 1918 were in press at the end of the year.

REPORT OF THE NATIONAL SOCIETY OF THE DAUGHTERS OF THE AMERICAN REVOLUTION.

The manuscript of the Twenty-second Annual Report of the National Society of the Daughters of the American Revolution was transmitted to Congress according to law in June, 1920.

THE SMITHSONIAN ADVISORY COMMITTEE ON PRINTING AND PUBLICATION.

The Smithsonian advisory committee on printing and publication passes upon all manuscripts offered for publication by the Institution or its branches and considers all forms of routine, blanks, and such other matters as pertain to printing and publication. Ten meetings were held during the year and 93 manuscripts were acted upon.

Respectfully submitted.

W. P. TRUE, *Editor.*

Dr. CHARLES D. WALCOTT,
Secretary of the Smithsonian Institution.